JUN 11 1918
UNIV. OF MICH.

The British Medical Journal

The Journal of the British Medical Association.

WITH SUPPLEMENT.

No. 2994. SATURDAY, MAY 18, 1918. **Price 1/-**

A useful Manual for Practitioners taking up Service.

HINTS FOR R.A.M.C. OFFICERS.

1s. net. (by post 1s. 2d.)

Edinburgh: WILLIAM BRYCE.
And all Booksellers.

NEW EDITION. In Two Vols. 45/- net.

DEFORMITIES

INCLUDING

DISEASES OF THE BONES AND JOINTS.

A TEXT-BOOK OF ORTHOPÆDIC SURGERY.

By A. H. TUBBY, M.S.Lond., F.R.C.S.Eng.

Illustrated by 70 Plates and over 1,000 Figures, and by Notes of Cases.

2ND EDITION.—"The standard text-book in English on the subject."—*The Lancet.*

1ST EDITION.—"Standard work on the subject in the English language."—*Brit. Med. Jour.*

MACMILLAN & Co., LTD.,
St. Martin's Street, London, W.C.

Now Ready. Pp. xi + 269. With 3 Charts. 5s. net.

ON ALCOHOLISM:

Its Clinical Aspects and Treatment.

By FRANCIS HARE, M.D.,
Medical Superintendent of the
NORWOOD SANATORIUM,
Beckenham.

"Marked by candour, common sense, and moderation . . . likely to become the standard text-book."—*British Medical Journal.*

London: J. & A. CHURCHILL,
7, Great Marlborough Street, W. 1.

Pp. viii + 350. With 102 Illustrations.

Price 7s. 6d. net.

DISEASES
OF THE
RECTUM AND ANUS

BY

P. LOCKHART-MUMMERY, F.R.C.S.

BAILLIÈRE, TINDALL & COX.
8, Henrietta Street, Covent Garden, W.C. 2.

By C. HAMILTON WHITEFORD, M.R.C.S., L.R.C.P.
NOW READY.

ACUTE APPENDICITIS.

(Practical Points from a twenty-five years experience).
Price 4s. net.

"Full of sound practical sense and judgment."—*Dublin Journal of Medical Science.*

"Should certainly be in the hands of every practitioner."—*Charing Cross Hospital Gazette.*

Also AN OPERATING THEATRE IN PRIVATE PRACTICE.
Price 3s. 6d. net.

London: HARRISON & SONS, 45, Pall Mall, S.W. 1.

ARCHIVES OF RADIOLOGY AND ELECTROTHERAPY.

The Original and Leading Periodical in the English Language devoted to the Study and Practice of Roentgenology and Electrotherapeutics.

Monthly, 3s. 0d. net.

Contents of May Number.

A CONSIDERATION OF THE VARIOUS METHODS NOW AVAILABLE FOR HEATING THE FILAMENT OF A COOLIDGE TUBE. By FRANCIS HERNAMAN-JOHNSON, M.D., Hon. Capt, R.A.M.C.

ON THE USE OF THE OPAQUE URETERAL CATHETER TO LOCALISE MISSLES IN THE REGION OF THE KIDNEY AND URETER. By ANDREW FULLERTON, M.D., M.Ch, F.R.C.S.I.

ELECTRICAL DEPARTMENT MILITARY HOSPITAL, TIDWORTH. By Captain F. GOWER-BERGIN, R.A.M.C.

FRACTURE OF SESAMOID BONES. By Major J. HALL-EDWARDS, R.A.M.C.

Report of Society. New Technique. Review. Notes and Abstracts.

Annual Subscription, payable in advance, 30s.

London:
WILLIAM HEINEMANN (Medical Books) Ltd.,
20, Bedford Street, W.C. 2.

JUST PUBLISHED.

AMPUTATION STUMPS.

By G. MARTIN HUGGINS, late Captain R.A.M.C. (T.), F.R.C.S.(Eng.), M.R.C.S.(Eng.), L.R.C.P. (Lond.); late Surgical Specialist, Pavilion Military Hospital, Brighton; Medical Officer Government Schools, Salisbury, Rhodesia. Fcap. 8vo. Pp. 240. 95 Illustrations. 7s. 6d. net.

IN THE PRESS.

THE HEARTS OF MAN.

By R. McNAIR WILSON, M.B., Ch.B.(Glas.), Lieut. R.A.M.C.(T.), Hampstead Military Hospital. Crown 8vo. Cloth. Fully Illustrated.

VACCINES AND SERA.

Their Clinical Value in Military and Civilian Practice.

By A. G. SHERA, M.B., B.C., M.R.C.S.(Eng.), L.R.C.P.(Lond.), Captain R.A.M.C. Pathologist to the British Red Cross Hospital, Netley. Fcap. 8vo.

HENRY FROWDE AND HODDER & STOUGHTON.
Oxford Press Warehouse, Falcon Sq., London, E.C. 1.

Works by J. B. HURRY, M.D.

VICIOUS CIRCLES IN DISEASE. Second and Enlarged Edition. 7s. 6d. net.

THE VICIOUS CIRCLES OF NEURASTHENIA AND THEIR TREATMENT. 3s. 6d. net.

VICIOUS CIRCLES IN SOCIOLOGY AND THEIR TREATMENT. 2s. net.

POVERTY AND ITS VICIOUS CIRCLES. 5s. net.

THE IDEALS AND ORGANISATION OF A MEDICAL SOCIETY. 2s. net.

J. & A. CHURCHILL, 7, Great Marlborough St., W. 1.

MILITARY MEDICAL MANUALS

Under the General Editorship of

SIR ALFRED KEOGH, G.C.B., LL.D., M.D., F.R.C.P., Hon. F.R.C.S.,
Late Director-General, Army Medical Service;

AND

Lieut.-Gen. T. H. J. C. GOODWIN, C.B., C.M.G., D.S.O., Director-General, Army Medical Service.

From THE BRITISH MEDICAL JOURNAL:—The books are short and practical, and are founded upon the most recent clinical and laboratory experience.

From THE LANCET:—"The names of the editors are sufficient guarantee that the subject matter is treated with fairness and discrimination."

From THE TIMES:—A series of really first-class Manuals of Medicine and Surgery ..... the translations are admirably made."

Please write for detailed prospectus of 21 volumes now ready.

UNIVERSITY OF LONDON PRESS, LTD. (P. Dept.),
18, Warwick Square, London, E.C. 4.

By C. MANSELL MOULLIN,

M.D.Oxon., F.R.C.S., Consulting Surgeon to the London Hospital.

ENLARGEMENT OF THE PROSTATE.

Fourth Edition. Price 6s.

THE BIOLOGY OF TUMOURS,

including the Bradshaw Lectures.

New and Revised Edition. Price 2s. 6d. net.

London: H.K.LEWIS&Co., Ltd., 136, Gower St., W.C.1

J. W. THOMSON WALKER,

M.B., C.M.Edin., F.R.C.S.Eng.

SURGICAL DISEASES AND INJURIES
OF
THE GENITO-URINARY ORGANS.

880 Pages, 24 Colour and 21 Black and White Plates, and 279 Illustrations in the Text. Price 25s. net.

"Will hold its place for many years as the best English text-book on the subject."
British Journal of Surgery.

CASSELL & Co., La Belle Sauvage, London, E.C. 4.

WHEELER'S OPERATIVE SURGERY

With an Introduction by
Surgeon-General Sir ALFRED KEOGH, G.C.B.

THIRD EDITION. Pp. x+384, with 226 Illustrations. Price 10s. 6d. net.

"The clearest book we have seen on the subject."
—*Guy's Hospital Gazette.*

BAILLIÈRE, TINDALL & COX,
8, Henrietta Street, Covent Garden, W.C. 2.

A SAVING IN YOUR TYRE BILL OF OVER 20% BY FITTING

INTERNATIONAL LIMOUSINE TYRES

which offer a distinct price advantage for a Medical Man.

For a trial ORDER we will Supply at Prices EQUAL to

25% OFF DUNLOP LIST.

WRITE TO-DAY FOR COMPLETE PRICE LIST.

INTERNATIONAL LIMOUSINE Tyres for **STRENGTH** and **satisfactory MILEAGE.** **DEFY BURSTS** by fitting **LIMOUSINE.**

We ask you to compare OUR PRICES with those YOU PAY to-day.

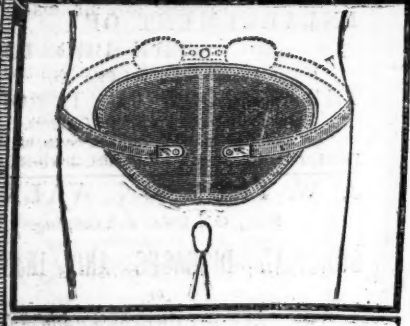
'PHONE —VICTORIA 6433. TELEGRAMS:—INTERNATIONAL VICTORIA 6433.

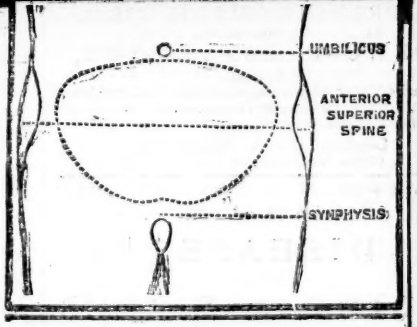
THE INTERNATIONAL TYRE & RUBBER CO., Ltd., Lower Belgrave Street, London, S.W. 1.

The

CURTIS ABDOMINAL SUPPORT

PATENTED 21103/10.





IMPORTANT.

TO PHYSICIANS AND SURGEONS.

Have you yet found an abdominal belt that produces a perfect hypogastric lift with the minimum of discomfort and the maximum of benefit, that retains its position without the use of perineal straps, and allows absolute freedom of movement? If not, send to us for particulars of the **"Curtis" Patent Abdominal Support.** The only reliable and effective mechanical Support for Entroptosis, Gastroptosis, Visceroptosis, etc., and for supporting scar tissue during consolidation, expediting convalescence and recovery.

PERSONAL ATTENTION GIVEN TO ALL PATIENTS.

WALTON & CURTIS, Ltd. (Patentees & Manufacturers),
8, OLD CAVENDISH STREET, LONDON, W. 1.
Telephone—Mayfair 6816.

INTRAVENOUS INJECTION IN WOUND SHOCK.

ABSTRACT OF THE OLIVER-SHARPEY LECTURES DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS ON APRIL 30TH AND MAY 2ND, 1918.

BY

W. M. BAYLISS, D.Sc., F.R.S.,

PROFESSOR OF GENERAL PHYSIOLOGY, UNIVERSITY COLLEGE, LONDON.

THE founder of these lectures was never tired of insisting on the importance of clinical measurements of the blood pressure, and himself devoted much valuable work to the design of appropriate methods of performing such estimations, as well as to methods of determining the haemoglobin percentage contained in the blood. It is therefore not inappropriate that I should ask your attention to the part played by changes in the blood pressure in wound shock, and to the importance of the supply of oxygen to the tissues.

The name "wound shock" was given by Captain Cowell to that state, resulting from injury, which shows itself as a general depression of vital activities, and may end in death if not combated. The names "surgical" and "traumatic" shock have also been used, but "wound" shock seems to be, on the whole, preferable.

Two stages are usually met with in the development of this state, which stages have been called "primary" and "secondary" shock. Either of these may be absent, and the former may pass insensibly into the latter.

DEFINITION.

Primary shock occurs immediately on receipt of the wound, and is in many ways similar to an exaggerated fainting. The collapse and fall of blood pressure is of benefit in that it tends to lessen haemorrhage. If the patient is kept warm and quiet during transit to the casualty clearing station the blood pressure may return to normal. On the other hand, after partial recovery, secondary shock may present itself with renewed low blood pressure and the various results of this condition. The low blood pressure and its consequences are the most general and obvious signs of the state of secondary shock, and it is with these that we are concerned in this place. When I refer to wound shock, it is to be understood that it is the secondary state which is under consideration, as being that requiring treatment.

NATURE OF WOUND SHOCK.

What is the actual nature of wound shock, and especially what is the immediate cause of the low blood pressure apart from haemorrhage, is still obscure.

Conditions which can be Excluded.

It will clear the way, however, if I mention briefly some suggestions that can be at once put on one side.

Acapnia (diminished carbon dioxide in the blood)—because the respiration is not of such a kind as to result in excessive removal of carbon dioxide.

Adrenal exhaustion—because adrenaline is present in excess when shock comes on.

Exhaustion of nerve centres—because reflexes are not diminished to any important degree except when the blood pressure has remained at a low level sufficiently long to paralyse the centres from want of oxygen.

Inefficient action of the heart—because when the arterioles are constricted by a dose of adrenaline the heart is quite able to raise the blood pressure to a high level.

Paralysis of arterioles or veins, especially of the abdominal area—because direct observation in the course of abdominal operations fails to show any abnormal distension.

The Hypothesis of "Exaemia."

The view which finds most favour is that of an accumulation and stasis of blood in capillary areas, so that it is removed from currency as effectively as if lost to the exterior. The name "exaemia" has been proposed by Major Cannon on this hypothesis. Whether there has been haemorrhage or not, then, there is a deficiency of blood in circulation, and the natural result of this is a low arterial pressure and a failure to supply the tissues with their normal requirements in oxygen.

But why is a low blood pressure the cause of such serious results as to need correction as soon as possible? It will be clear that the due supply of blood to the organs of the body depends upon an adequate pressure. The blood conveys oxygen and removes carbon dioxide and other waste products. Gesell has shown that the blood flow through an organ is reduced more by a fall from a high pressure to a moderate one than by a further fall of the same extent, and that, as the pressure falls, the blood supply is reduced to a greater proportion than the pressure itself. I have been able to confirm this statement, and the practical conclusion to be drawn is that even a moderate fall of blood pressure is not to be looked upon as of little consequence.

Effects of Insufficient Blood Supply Owing to Low Pressure.

The pathological changes which take place in cells when insufficiently supplied with blood are well known. I may mention the suppression of renal secretion, the failure of cardiac contraction below about 90 mm. Hg (Markwalder and Starling), and the changes in nerve cells. Recovery takes place if the pressure is restored without too long a delay. In cats I found that the vasomotor centre loses reflex excitability after one to two hours of an arterial pressure of 60 mm. The respiratory centre fails earlier (Pike and Stewart, Pilcher and Sollman).

A good blood supply is also necessary because various other injurious influences, such as cold, injury to muscles, asphyxia, anaesthetics, acid production, temporary obstruction of circulation to a large part of the body, may not be great enough to have serious consequences, each by itself alone, but becomes so when combined with a small loss of blood, itself also innocuous alone. Gas gangrene is stated to be held in check by a good circulation of blood. Finally, renal secretion is directly dependent on the arterial pressure, so that the elimination of acid and toxic products in the urine is retarded by a low pressure. Experimentally, one finds that the other symptoms of shock disappear when the blood pressure is raised. For example, the rapid shallow respiration after muscle injury is restored to normal when the blood pressure is raised by injection of gum solution.

It appears, indeed, that what we call wound shock is the result of a more or less complex combination of various deleterious factors, not always the same, but always exaggerated by haemorrhage, which is rarely absent, though sometimes not great.

Since the introduction of the Riva-Rocci instrument and its modifications, of which the "Tycos" is very easy to use and keep in order, the measurement of the blood pressure has become a simple matter and ought to become a routine practice.

MEANS TO RAISE BLOOD PRESSURE IN WOUND SHOCK.

What means shall be used, then, to raise the blood pressure in shock? I would point out, to begin with, that a high blood pressure is not our object for its own sake. We wish to increase the blood supply and oxygen supply to the tissues, especially to vital organs such as the nerve centres and the heart. For this reason the use of vaso-constrictor drugs is to be deprecated. Apart from their transitory effect, the result is actually a lessened blood supply to the tissues, because the rise of blood pressure is obtained by narrowing the arterioles which convey the blood. The correct way is to increase the volume of blood in circulation, which involves a raised arterial pressure without decrease of peripheral blood flow.

It is natural to assume that transfusion of blood itself is the best way to do this. I do not propose to discuss this matter at length. A detailed memorandum will shortly be published by the Shock Committee of the Medical Research Committee. Donors are not always available in sufficient number, however, and it is a difficult matter to keep on hand preserved blood or suspensions of corpuscles in sufficient quantity to meet emergencies. A substitute, if efficient, is highly desirable, especially if of such a kind as to be available in unlimited amounts. I may anticipate a little here to remark that, somewhat to my surprise, blood has not shown itself, experimentally, to be so far superior to certain artificial solutions as would have been

expected. If a given case failed to respond to gum, blood was also ineffective. It is probable that, under ordinary conditions, we possess a reserve of haemoglobin, so that the tissues are sufficiently supplied with oxygen by a diluted blood, so long as the body is at rest. Captain Bazett has found cases doing well with a very low haemoglobin value. Another experimental fact seems of some significance: a dilute blood is more effective under a high pressure than a normal blood under a low pressure. This is no doubt connected with the fact above mentioned, that a high pressure is relatively more effective than a low pressure, a fall of one-third means a fall in blood supply by two-thirds or more.

Various Fluids Proposed and Used.

Ringer's solution, although naturally one of the first to be tried, has been found to be useless, both experimentally and in actual practice. It leaves the vessels in the course of half an hour or so, while the blood pressure returns to its former level or even lower. Why is this? Such saline solutions have two obvious defects when compared with blood. These are (1) a low viscosity, so that a given volume is much less effective than its equivalent in blood, even in its immediate effect, and (2) the absence of a colloid with an osmotic pressure. The value of the latter is somewhat difficult to explain shortly. Since the blood vessels are freely permeable to water and salts, while impermeable to colloids, the osmotic pressure of the latter is active and prevents the escape of fluid to the tissues by its attraction for water. Thus the colloids of the blood must not be diminished in strength, for otherwise they do not keep the water from being filtered out in excessive amount by the arterial pressure.

Hypertonic Saline.—This has been used with the object of preventing this escape of fluid by means of the osmotic pressure of the salt. But it will do this only so long as the salt content in the blood remains higher than that of the tissue fluid. Since salts diffuse through the walls of the blood vessels at a great rate, their concentration rapidly becomes equal on both sides, and then the conditions are the same as with Ringer's solution. Experimentally I have found that 2 per cent. sodium chloride is very little, if any, superior to isotonic saline for the purpose in view. It may be mentioned that its value in cholera may be due to other causes, which do not concern us here. Hypertonic saline produces oedema of a perfused organ just as isotonic saline does. Moreover, the injection of hypertonic solutions of any kind requires care; I have seen unpleasant symptoms, such as gasping respiration and slowing of the heart, in cats.

Addition of calcium has been recommended for two reasons. It acts as a vaso-constrictor. But this is very transitory, and we have seen that it is undesirable. It has been stated to decrease the permeability of the blood vessels, and so prevent oedema and transudation in various situations. I have, however, been unable to detect any difference between the rate at which Ringer's solution with and without excess of calcium leaves the circulation, and Cushny has tested the effect on transudations without obtaining any effect.

Acidosis.

Alkaline solutions (*sodium bicarbonate*) are advocated on the ground that "acidosis" is found to be present in wound shock (Cannon). A brief consideration of this matter is necessary. The blood, of course, never becomes really acid. What happens is that a part of its normal bicarbonate content becomes neutralized by combination with some fixed acid (lactic, etc.) produced in the tissues on account of defective oxygen supply. The point is, does this involve an increase of the hydrogen ion concentration? Is there any real increase in acidity? Some observers have thought such a change to be the essential cause of shock. We may note that the various results described as produced by acidosis are those due to rise in the hydrogen ion concentration. In experiments made to test the question, I have found that as much as one third to one-half of the bicarbonate can be combined with fixed acid without the production of any increase in the hydrogen ion concentration of the blood.

What is the explanation of this? The first effect of the introduction of acid into the blood is to drive off carbon dioxide from a part of the bicarbonate, thus temporarily raising the hydrogen ion by excess of carbonic acid. But as soon as such blood reaches the respiratory centre, hyperpnoea is caused and the excess carbon dioxide is rapidly removed by the increased ventilation of the lungs. Normally, as Haldane and Priestley have shown, the respiratory centre is extraordinarily sensitive to hydrogen ions and responds by a vigorous discharge.

But, it will be said, suppose the centre is less sensitive, owing to a dose of morphine, for example. Can the "acidity" of the blood rise to a serious extent? I have also tested this possibility. As Lawrence Henderson has shown, as long as any bicarbonate remains there can only be a small rise in the hydrogen ion concentration of the blood, or any similar solution, since the carbon dioxide for the most part cannot remain in solution. The actual change in the blood in my experiments was not greater than the difference between the values of concentrations of hydrogen ion between 1.58×10^{-7} and 1.26×10^{-7} normal. This is extremely small and would be produced by the addition of 0.01 gram of lactic acid to about 10,000 litres of water. To change the more acid blood into normal blood would require merely the reduction of the alveolar content in carbon dioxide to one-half its normal value, a change easily effected by respiration. Henderson and Haggard point out that to maintain the hydrogen ion constant when the Van Slyke value falls from 63 to 42, a marked "acidosis," requires only 50 per cent. more ventilation of the lungs, and that people living at high altitudes have a "normal" hydrogen ion concentration although their carbon dioxide level is very different from that at ordinary barometric pressure.

We may next consider briefly whether the physiological results ascribed to acidosis could be produced by so small a rise in hydrogen ion concentration as may occur.

Stimulation of Nerve Centres.—With the exception of the respiratory centre, the bulbar centres are not easily stimulated by acid. We know that the vasomotor centre is stimulated in asphyxia by the carbon dioxide in the blood, but Mathison has shown that a fairly strong acid injection is required to do this.

The Heart.—Patterson showed that the heart is affected deleteriously by respiration of carbon dioxide of 5 per cent., but not below this value. This is equivalent to neutralizing more than two-thirds of the bicarbonate by acid, supposing that the respiratory centre were inactive. Moreover, the effect of acid is antagonized by very small amounts of adrenaline.

The Arterioles.—Very weak acid (1 in 10,000) causes dilatation. But the hydrogen ion concentration of Ringer's solution is raised by this addition to more than 1,000 times that possible in acidosis.

Capillary blood vessels, Severini stated, were dilated by carbon dioxide, but Roy and Graham Brown failed to confirm the statement. Dale and Richards have brought forward indirect evidence that acid has not this effect.

Transport of Oxygen.—As Barcroft showed the presence of acid in the blood, while it does not much affect the amount taken up by haemoglobin at the alveolar tension of oxygen, reduces the amount held by it at the oxygen tension in the tissues. Consideration will show that this is really an advantage, since the blood arrives at the tissues with practically as much oxygen as normally, while it leaves the tissues with less. The state of acidosis provides the tissues with an increased supply of oxygen.

Viscosity of Blood.—Although statements have been made that acid increases this property, I have been unable to detect any change, even on saturation with carbon dioxide.

Red corpuscles, Hamburger showed, swell in the presence of carbon dioxide. That this does not produce a rise in viscosity is possibly to be explained by the fact that they do not increase in diameter, but become more spherical.

Swelling of Colloids.—Martin Fischer has advocated a series of theories of oedema and nephritis, etc., on the basis of the swelling of colloids and cells by acid. But his experiments show that a concentration of lactic acid greater than N/80 is necessary to affect fibrin or muscle. This has a hydrogen ion concentration more than 10,000 times that possible in blood.

Oxidation Processes.—Some oxidation processes are depressed by acid, but others are not, and the increase found experimentally in sea-urchin eggs was produced by comparatively strong alkali. Lactic acid is rapidly oxidized

in muscle in acid medium, provided that oxygen is freely supplied.

In *diabetes* there is a low bicarbonate reserve, but the blood pressure is not low, while the state could scarcely be called one of shock. Poulton has shown that there is no increase in the hydrogen ion concentration in coma.

Experimental Injection of Acid.—Sometimes, especially in unhealthy animals, the introduction of acid leads to progressive fall of blood pressure to a shock level. But, on the other hand, large quantities may be injected without result, as Dale and Richards have shown. I find no difference between the effects of acid and neutral phosphates in equal amounts.

Conclusions as to Acidosis.

On the whole, I am compelled to conclude that "acidosis" is not in itself a serious factor in shock, and that alkaline injections are not called for. The existence of a decreased bicarbonate content is, however, a sign of defective oxygen supply. In various forms of experimental shock I have found the injection of bicarbonate solutions of small and temporary value only. What effect was produced might have been equally well due to the volume of fluid introduced. If other reasons are thought to require the use of alkali, it is best given by stomach or rectum. The effective way of treating the production of acid in the tissues is by increasing their supply of oxygen from the blood. This suggests that a slight increase of acidity may really be of benefit, since it stimulates the respiratory centre to increased ventilation of the lungs.

Solutions of salts in general are merely of temporary value, and liable to be followed by a greater fall of blood pressure.

REASONS FOR USING A COLLOID: GUM ARABIC.

A colloid must be added to remedy the defects of such solutions. What substances are available and possible for the purpose?

Since such a colloid must possess an osmotic pressure, starch and agar can be excluded at once. Dextrin is deficient in viscosity. Proteins are inadmissible on account of anaphylaxis. They have also an injurious effect on the kidney. We are left with gelatin and gum arabic, both of which satisfy requirements both as to viscosity and osmotic pressure. There are objections to gelatin on account of its liability to contain tetanus spores. But the more serious objection is its liability to cause intravascular clotting, as found by Dale and Richards. Fortunately, gum has none of these defects. A solution of 6 per cent. strength has been found, both in the case of wounded men and in lower animals, to maintain the blood pressure indefinitely. It does not leave the blood vessels. Gum is quite innocuous, even in a volume equal to one-half of the total blood volume, or an injection of more than a litre and a half in man. It produces no haemolysis nor agglutination in man and does not increase the viscosity of the blood. Since it contains no protein, anaphylaxis in case of a later injection would not be expected, and, tested on guinea-pigs, was found not to occur.

Although gum seems rather a strange substance to introduce into the blood, it is chemically a very inert substance and is not really foreign to animal metabolism. It consists of derivatives of galactose and of arabinose. Galactose is a natural sugar present in milk. Arabinose appears in the urine in pentosuria and appears to arise from galactose by removal of carbon dioxide (Neuberg).

Since commercial products contain small amounts of calcium and potassium salts, there is no need to add them. All that is necessary is the addition of 0.9 per cent. of sodium chloride, and tap water may be used. The solution must be filtered through flannel or other convenient medium and then sterilized. A strength of 6 per cent. is probably the best for routine use, and arrangements are made for its supply through the usual mechanism of the Army Medical Department. In practice, even 3 per cent. has been found greatly superior to saline solutions, but it is clear that its osmotic pressure is not the optimal one.

The value of gum infusions is, naturally, most striking and rapid after haemorrhage. But practical experience, as shown, amongst others, in the cases reported by Captains Cowell and Drummond and Taylor, has demonstrated its utility in various other forms of shock. It is not to be expected to be of avail when the bulbar centres have permanently lost their excitability; but even blood is useless in such cases. Hesitation might be felt in transfusing blood in a case apparently hopeless, and one advantage of gum is that no restriction in its use need be felt. A case is reported by Captain Cowell, pulseless and moribund on arrival at the casualty clearing station, restored permanently by gum. The dangers of prolonged low blood pressure justify the contention of Colonel Fiaschi and Captain Bullock, who insist on the importance of early intravenous injection, as soon as possible after the injury. There is, of course, some risk of increasing haemorrhage. Drummond and Taylor advocate the use of the tourniquet in the case of wounds of limbs. If there is internal bleeding, it may unfortunately be necessary to defer intravenous injection until operation is commenced.

Experiments with Gum Solution.

On account of the fact that gum showed itself to be useful in wound shock generally, I have made some experiments on cats in order to investigate its effect in states of low blood pressure other than those due to haemorrhage alone. We may remember that there is reason to believe that in all such cases blood is out of currency somewhere and can be replaced by an appropriate solution, allowing recovery to take place in due time.

A shock-like condition may be produced experimentally by prolonged cold, by asphyxia, by local anaemia on reopening the blood current, and sometimes by injection of acid. In all cases the state is much exaggerated by slight haemorrhage and is effectively treated by gum injection. Erlanger and his colleagues have recently found that gum holds fluid in the vessels in all forms of shock with which they worked, that due to exposure and manipulation of the intestines, in addition to that of temporary anaemia of a part of the body. I may remark that, although intestinal trauma is a common mode of inducing experimental "shock," it seems to me that it is rather dissimilar to the actual wound shock met with after shell wounds.

SHOCK IN INJURIES OF MUSCLES.

Probably the most interesting form of experimental shock is that due to crushing of muscles. The experiments were commenced in conjunction with Major Cannon and continued, from another point of view, since his departure. The appearance of the injured muscle reminded us very strikingly of that of muscles in recent shell wounds as we had seen them in France, and the general phenomena are more like those of wound shock than most forms of experimental shock are. General Cuthbert Wallace has called attention to the greater liability to operative shock when large masses of muscle are cut. Compound fractures and multiple wounds are commonly followed by more or less severe shock.

In a typical experiment severe mutilation of the thigh muscles in decerebrate cats, or cats under urethane or ether, results in a primary fall of blood pressure, which may or may not be partially recovered from. This fall is usually followed by a further progressive fall, which can be counteracted by gum with return of the blood pressure permanently to the normal height. The phenomena appear to be due to the absorption of some depressant substance from the injured tissue, since they occur when the spinal cord has been divided in order to exclude nervous reflexes. This substance is either oxidized or eliminated if the blood pressure is high enough. It is not lactic acid, as would naturally be supposed, since the injection of lactic acid during the state of low pressure is rather beneficial than otherwise, and bicarbonate injections are almost useless. Massage of the injured muscles results in a further fall of blood pressure, with dilatation of the intestinal vessels. This fact is of interest in connexion with the great benefit known to follow the immobilization of fractured thighs by the use of the Thomas splint during their transit to the casualty clearing station.

Respiratory Disturbance in Shock.

A remark may be made on the peculiar form of respiration shown in these cases of muscle injury. It has often been noticed that wound shock is associated with a rapid but shallow breathing, occasionally interrupted by a deep sigh. This is also the case in cats, where the rapid return to normal when the blood pressure is raised by gum is

very striking. The cause and nature of the phenomenon require investigation. It may also be seen after haemorrhage, but, so far as my experiments go, a mere fall of blood pressure, as by inhibition of the heart or the injection of a dose of acetyl-choline, does not produce it. It has some significance in connexion with acidosis, because it is quite different from the rapid but deep breathing caused by rise in hydrogen ion concentration. A condition similar to the respiration of shock has been described by Haldane in late stages after gassing, and ascribed to an exaggeration of the Hering-Breuer inhibition of inspiration.

Conditions in which Gum Injections are Valuable.

Some cases treated with gum injections by Fraser and Cowell and by Drummond and Taylor may be briefly mentioned in order to indicate the variety of states in which it may be of service to practise such injections. Severe haemorrhage from abdominal wounds and from arteries; cases in which haemorrhage and shock were not excessive, but in which a dangerous fall of blood pressure followed operation; other cases in which there was severe shock, but only slight haemorrhage, were all treated with success. Some of these were complicated by gas gangrene, and one case of this infection in which there was neither shock nor haemorrhage, but a blood pressure of only 70 mm. Hg, recovered after the blood pressure had been restored by gum.

GENERAL CONCLUSION.

The general practical conclusion to be drawn from the various considerations brought forward is, I think, that the main factor in the successful treatment of wound shock is to ensure an adequate supply of blood—that is, of oxygen—to vital organs, especially to the nerve centres. This is most simply done by intravenous injection of gum solution, which does not appear to be, in most cases, inferior to blood. When very great haemorrhage has occurred, it would seem reasonable that blood transfusion should be preferred.

If the use of sodium bicarbonate is thought necessary, it is best given by stomach or rectum. But it has not yet been demonstrated that the symptoms relieved by bicarbonate would not be more effectively cured by raising the blood pressure. In principle it would seem to be a mistake to reduce the slight increase of acidity in the blood, since this is of value in stimulating the respiratory centre, and there is no evidence that the slight increase of hydrogen ion concentration which is present in some cases of acidosis, but not always, is in any degree harmful in itself.

A Collective Investigation

OF

TEN THOUSAND RECRUITS WITH DOUBTFUL HEART CONDITIONS.

Conducted at the National Hospital for Diseases of the Heart by C. CHAPMAN GIBBES, R. O. MOON, S. RUSSELL WELLS, P. HAMILL, F. W. PRICE, and J. STRICKLAND GOODALL.*

Preliminary Report, compiled by
S. RUSSELL WELLS, M.D., B.Sc.

IN February, 1916, by desire of the War Office, the honorary medical staff of the National Hospital for Diseases of the Heart undertook to act as expert referees on all cases of doubtful cardiac conditions referred to them by the various recruiting boards of the metropolitan area.

Methods Employed.

In every case an exhaustive medical history was taken, inquiry was made into subjective symptoms complained of, and the ordinary clinical examination by inspection, palpation, percussion, and auscultation was undertaken. In addition to this the urine of every recruit was examined, the pulse, blood pressure, and the respiration was taken in the recumbent position before and immediately after a standardized piece of exercise, and again after three minutes' rest in the recumbent position. Each case was electro-cardiographed, and the heart was examined by means of the *x* rays. As the result of these various methods of examination a diagnosis was arrived at, and the medical boards were advised as to the category for service for which, in the opinion of the examining physician, the recruit was fitted, the responsibility for the actual classification adopted necessarily resting with the medical boards. The subjoined form, which was filled up in the case of every recruit examined at the hospital, a copy of which was transmitted to the medical board sending him for examination, will show the character of the inquiry.

REPORT ON CARDIAC CONDITION OF RECRUIT.

Name ..... Date .....
Occupation ..... Age .....
Recruit's Statement .....

Previous Diseases:

Specific Fevers	Growing Pains .....
Rheumatic Fever	Diphtheria .....
Chorea	Influenza .....
Tonsillitis	Haemorrhages .....
Other Diseases	

Habits:

Exercises .....
Alcohol .....
Tobacco .....

Subjective Symptoms:

Breathlessness	Faintness .....
Pain	Sleeplessness .....
Palpitation	Nocturnal Decubitus .....
Vertigo	Diuresis .....
Sense of Exhaustion	

Inspection:

Appearance	
Anaemia	Clubbing .....
Cyanosis	Jugulars .....
Pulsations and Impulses ...	Oedema .....
Vasomotor Disturbances	

Palpation.

Heart.—Rate	Thrills .....
Apex Beat.—Position	Character .....
Remarks	
Pulse.—Rate	Rhythm .....
Character	Volume .....
Vessel Walls	

Percussion.

Limits of cardiac dullness.
Right ..... inches from mid sternal line.
Left ..... inches from mid sternal line.
Remarks .....

Auscultation.

Heart sounds .....
Adventitious sounds .....

State of Other Organs .....
Urine.—Sp. gr. ..... Albumin .....

Reaction to Standard Work.

Before Exercise:
Pulse..... Blood pressure..... Respiration.....
After Exercise:
Pulse..... Blood pressure..... Respiration.....
After Exercise (3 minutes).
Remarks .....
Work done ..... foot lb. in ..... seconds.

Electrocardiogram. .....

X-ray Examination. .....

Remarks .....

DIAGNOSIS .....

RESULTS OF EXAMINATION:

So far as concerns his heart the above recruit is fit for
.....

Signed .....

As the result of this work a large number of records have been accumulated, and it is felt that the material thus obtained, if carefully analysed, may assist in elucidating certain problems connected with affections of the heart.

* Dr. Moon left for army service in April, 1917; Dr. Hamill left for army service in July, 1916; Dr. Price was away on leave of absence for six months from the beginning of December, 1916.

Special Nature of Cases Investigated.

It is necessary to bear in mind the general character of the cases dealt with. They are not, and cannot be, an average sample of the population. All recruits presenting themselves had been, in the first instance, examined by boards of competent medical advisers, cases where the heart was obviously normal having been passed by them, if suitable in other respects, as fit for service, and also most of those who showed well marked and definite diseases having been rejected. Consequently, the men referred to the Heart Hospital were only cases about whose fitness there was some doubt, or cases of cardiac disorders in regard to whom there was difficulty in deciding in which category they should be placed. These cases, therefore, may be considered a fair example of the difficulties encountered by the practitioner in cardiac medicine.

It is in this fact that their value, as a subject for investigation, lies. While it is not suggested that the diagnoses of the staff of the hospital are in any way infallible, the facts observed may be taken to represent observations by physicians who have had more than the average experience in dealing with this class of case.

Up to January 14th, 1918, 10,000 different recruits were examined, as well as 181 men already in the army, who were referred for opinion by army medical officers.

In order to eliminate, as far as possible, the personal equation, and to promote a uniform standard, for some months every recruit was examined independently by two physicians, the two working together being varied from time to time.

The average time that each individual recruit was actually under examination was a little over an hour. The taking of histories, *x*-ray examination, urine examination, and exercise test of about the first thousand was carried out by the examining physicians. After that, these portions of the examination were made by trained assistants. The actual examination by the physician then averaged a quarter of an hour per recruit.

When over 2,000 had been examined conjointly, and there was a probability of a general consensus of opinion having been established, on account of the time required and of the number of recruits, each was examined by one physician only.

Classification of Recruits to August, 1916.

From February 10th, 1916, to August 7th, 1916, the recruits were classified by the authorities according to the following schedule:

1. Fit for general service at home and abroad.
2. Fit for field service at home.
3. Fit for garrison service (*a*) abroad; (*b*) at home.
4. (*a*) Fit for labour purposes (road-making, entrenching, works companies, etc.). (*b*) Fit for sedentary work as clerk, etc.
5. Unfit for any service.

Results of 3,830 Examinations.

The annexed schedule gives the classification recommended by the examining physician in the case of the 3,830 recruits examined between these dates, classified in periods of 1,000 each.

Table showing Results of Examinations from February 10th, 1916, to August 7th, 1916.

Class.	Nos. 1–1000		1000–2000.		2000–3000.		3000–3830.		Total.	
		%		%		%		%		%
1 ...	405	40.5	273	27.3	252	25.2	177	21.3	1107	29.0
2 ...	184	18.4	184	18.4	226	22.6	174	21.0	768	20.0
3A ...	63	6.3	145	14.5	115	11.5	135	16.3	458	12.0
3B ...	174	17.4	164	16.4	224	22.4	198	23.8	760	19.8
4A ...	5	0.5	7	0.7	2	0.2	—	—	14	0.4
4B ...	114	11.4	169	16.9	125	12.5	107	12.9	515	13.4
5 ...	55	5.5	58	5.8	56	5.6	39	4.7	208	5.4
Total ...	1000		1000		1000		830		3830	

It is interesting to note that there is a steady decline in the proportion of men presenting themselves who were considered fit for full service. Class 1 consists of men who, after the full examination at the hospital, were considered to have sound hearts, although the less extensive examination at the recruiting office had left some doubt in the minds of the examiners, and in this first group of 3,830 they constitute 29 per cent. of the whole. Classes 2, 3A, and 3B were considered fit for some modified form of combatant service, although they presented evidence of some cardiac abnormality; 1,986 men were placed in these groups—that is to say, 51.8 per cent. of all examined. They were largely men showing the so-called "functional" murmurs and the like. Classes 4A, 4B, and 5, which comprised 737 men—that is, 19.2 per cent.—were considered unfit for combatant service, because in most cases, in the opinion of the examining physicians, definite structural lesions, either valvular or myocardial, or grave functional disturbances, were present. That this class is so small is due, no doubt, to the care with which definite and obvious cases of heart disease had been eliminated by the medical boards.

New Classification from August, 1916.

On August 8th, 1916, the classification was changed, and from then till the present date the following schedule has been in operation:

A. Fit for general service. Recruit should be fit for general service as soon as trained.
B. Fit for service *abroad*, but not fit for general service:
  (1) In garrison or provisional units.
  (2) In labour units or on garrison or regimental outdoor employments.
  (3) On sedentary work as clerks or storemen only.
C. Fit for service *at home* only:
  (1) In garrison or provisional units.
  (2) In labour units or on command garrison or regimental outdoor employments.
  (3) On sedentary work as clerks, storemen, batmen, cooks, orderlies, sanitary duties, etc.
D. Unfit for any service.

It will be observed that A corresponds to 1 in the old scheme, while B1 and C1 correspond to 3A and 3B; B2 and C2 may be taken as corresponding to 4A, and B3 and C3 to 4B, while D is the same as 5.

Results of 6,170 Examinations.

The results of examination from August 8th, 1916, to January 14th, 1918, are shown in the following schedule:

Class.	3830–4000.		4000–5000.		5000–6000.		6000–7000.		7000–8000.		8000–9000.		9000–10000.		Total.	
		%		%		%		%		%		%		%		%
A.	43	25.3	196	19.6	174	17.4	100	10.0	50	5.0	76	7.6	80	8.0	719	11.6
B1.	39	22.9	250	25.0	289	28.9	241	24.1	108	10.8	101	10.1	102	10.2	1130	18.3
C1.	39	22.9	246	24.6	221	22.1	242	24.2	222	22.2	204	20.4	169	16.9	1343	21.8
B2.	—	—	7	0.7	36	3.6	56	5.6	54	5.4	80	8.0	106	10.6	339	5.5
C2	4	2.4	10	1.0	29	2.9	71	7.1	119	11.9	125	12.5	129	12.9	487	7.9
B3.	11	6.5	83	8.3	39	3.9	56	5.6	69	6.9	128	12.8	212	21.2	598	9.7
C3.	27	15.9	173	17.3	178	17.8	217	21.7	315	31.5	210	21.0	163	16.3	1283	20.8
D.	7	4.1	35	3.5	34	3.4	17	1.7	63	6.3	76	7.6	39	3.9	271	4.4
Total	170		1000		1000		1000		1000		1000		1000		6170	

At first the class of men presenting themselves was fairly similar to those dealt with in the last 1,800 in the previous schedule; but, as time went on, fewer and fewer fit men were seen. No doubt this is partly due to the fact that the absolutely fit joined the army early, and that by this time the general standard of the population to be drawn on was lower; but another factor of great importance, so far as these returns are concerned, is that the later numbers contain an ever-increasing proportion of men who had previously been rejected by medical boards and were called up for re-examination. It also seemed to the examining physicians that the medical boards increasingly referred to them men whom they proposed to put in some of the lower categories but who themselves were desirous of being placed still lower, and probably in this way the hospital performed a useful function in convincing many discontented recruits that their cases had been adequately investigated, and their category only decided on after full investigation.

The full-service men on the new classification from August 8th, 1916, to January 14th, 1918, fell to 11.6 per cent. The total rejections remained fairly constant, being

4.4 per cent. as opposed to 5.4 per cent., while those considered capable of some form of combatant service fell from 51.8 per cent. to 40.1 per cent., and the labour and clerical class rose from 13.8 per cent. to 43.9 per cent.

Age in Relation to the Above.

The annexed table of ages shows no striking accumulation of numbers for any particular age. The large number at 18 is accounted for by the calling up of this class, which commenced towards the end of 1916.

Age.	No. of Recruits.	Age.	No. of Recruits.	Age.	No. of Recruits.	Age.	No of Recruits.
15*	1	24	433	32	452	40	3 4
16*	5	25	410	33	4.9	41	110
17	129	26	424	34	419	42	25
18	910	27	445	35	413	43	3
19	386	28	497	36	401	44	3
20	321	29	469	37	312	45	1
21	357	30	499	38	343	46	1
22	369	31	397	39	334	48	1
23	387						

* Trying for the Royal Flying Corps as boy mechanics.

Classification of Occupations.

Considerable difficulty was experienced in arriving at a suitable basis of classification of the various occupations. The scheme of classification adopted in the census returns, though very suitable for the purpose for which it was designed, did not bring out the features which are important from the medical standpoint, nor could we find any widely accepted method of classification suitable for our purpose. It was therefore decided to adopt a vertical classification of indoor, partly indoor, and outdoor occupations subdividing these into sedentary, semi-sedentary, and active, the active being again subdivided into light, medium, and heavy, with reference to the amount of muscular work entailed, while a transverse or cross classification was made dependent upon professions and trades.

Occupations. Summary of Classification.

	Indoor.					Partly Indoor.			Outdoor.			Total
	Sedentary.	Semi-sedentary.	Active.									
			L.	M.	H.	L.	M.	H.	L.	M.	H.	
Professional ...	162	313	—	—	—	8	27	—	—	—	—	510
Theatrical ...	—	23	57	—	1	—	—		—	—	—	81
Commercial ...	2345	62	25	—	—	10	1	—	—	—	—	2443
Shopkeepers ...	—	—	1176	465	—	—	-	—	—	—	—	1641
Miscellaneous ...	10	—	2	1	—	227	1		—	—	—	241
Liquor trade ...	—	—	10	88	—	—	—	—	—	—	-	189
Domestic	—	—	98	—	—	—	—	—	—	—	—	98
Iron, copper, brass	—	—	5	424	249	—	1	—	2	7	4	692
Lead	4	—	5	16	4	112	43	—	—	—	—	184
Mercury	—	—	1	—	—	—	—	—	—	—	—	1
Wood	—	—	44	290	—	2	2	—	6	1	3	348
Leather	—	—	4	142	—	—	-	—	—	—	—	146
Textiles	—	—	107	23	—	—	—	—	—	—	—	130
Printing	—	10	158	62	—	—	—	—	—	—	—	230
Stone, cement ...	—	—	7	15	9	—	—	—	58	—	40	129
Glass, pot	—	—	4	8	—	—	—	—	1	—	—	13
Miscellaneous handicrafts	—	172	172	467	412	3	—	2	188	307	608	2331
Transport	—	—	—	—	—	—	—	—	72	260	226	558
No occupation, 35	—	—	—	—	—	—	—	—	—	—	—	35
Total (+ 35) .	2521	580	1966	2031	675	362	75	2	327	575	881	10,000

As was to be expected in dealing with an urban population, those following an indoor occupation greatly preponderate over the outdoor workers, 7,743 being engaged indoors, 439 partly indoors, and 1,783 out of doors; 35 had no occupation; 5,756 were engaged in sedentary, semi-sedentary and light active occupations, while 4,209 followed employments entailing medium or heavy muscular exercise, 2,651 being in the medium and 1,558 in the heavy class. Since the total was 10,000, percentages are given simply by moving the decimal point two places to the left.

Comparison with London Census.

It is interesting to compare these figures with the Occupation Returns for the County of London. Vol. xxiii of *London Statistics*, issued by the London County Council, contains a classification of the employments of the male population of the County of London based upon the census returns of 1911. This classification, unfortunately, does not distinguish between sedentary, light, medium, and heavy work, and the bulking in large groups makes a detailed analysis difficult, if not impossible. Still, some interesting facts may be deduced from a comparison of percentages in the different categories of the London census and of the 10 000 recruits examined.

With this end in view the figures for the occupations of the recruits have been rearranged, so far as possible, on the lines of the London census, so that they may be compared.

The annexed table gives this comparison with the numbers involved.

	London Census, 1911.		Recruits.	
	No. of Men.	Per Cent.	No. of Men.	Per Cent.
I. Professional	69,642	5	499	5
II. Domestic	58,667	4.2	167	1.7
III. Commercial	137,539	9.8	3,616	36 2
IV. Conveyance of men, goods, and messages	246,093	17.5	1,003	10
V. Metals, machines, implements, and conveyances	112,302	8	900	9
VI. Precious metals, jewels, watches, instruments, and games	27,205	1.9	210	2.1
VII. Wood, furniture, fittings, and decorations	60,665	4.3	542	5.4
VIII Skins, leather, hair, and feathers	19,558	1.4	179	1.8
IX Textile fabrics	22,899	1 6	19	0.2
X. Dress	81,780	5.8	385	3.8
XI. Food, tobacco, drink, and lodging	155,493	11	737	7.4
XII. Other occupations	412,719	29.5	1,743	17.4
	1,404,262		10 000	

The percentages in Groups I, V, VI, VII, and VIII are sufficiently the same to be regarded as practically identical. The most striking discrepancy occurs in Group III, that of the commercial classes. These constitute only 9.8 per cent. of the male workers of London, while no less than 36.2 per cent. of the 10,000 recruits examined belonged to this category. Groups II, IV, IX, X, XI and XII bulk larger in the census returns than they do among the recruits.

These discrepancies may be due to one or more of several causes. First, our classification may not be quite the same as that adopted by those who compiled the London statistics, but, as considerable care has been exercised in the classification, it is hardly likely that this can account for the great differences. Secondly, it is possible that all classes of the community have not been drawn upon equally for recruits; but an inspection of the list and a consideration of those classes which would be most likely to be exempted does not afford much support to this view, though it may be the reason for the transport workers furnishing fewer doubtful recruits than their proportion in the population would lead one to expect. Taking these facts into consideration, however, it seems legitimate to conclude that there is, on the whole, a greater proportion of doubtful heart cases in some employments than in others. This, however, still leaves it open to question whether this greater incidence is due to men with defective hearts naturally drifting into light

occupations, such as that of a clerk, or whether such occupations themselves lead to any particular form of heart weakness. This point can only be decided by a detailed examination of the incidence of the various forms of cardiac derangement in the various occupations. An attempt to do this will be made later.

EPIDEMIC POLIOENCEPHALITIS.

(SO-CALLED EPIDEMIC BOTULISM.)

BY

CHARLES H. MELLAND, M.D.LOND., M.R.C.P.,

ASSISTANT PHYSICIAN, MANCHESTER ROYAL INFIRMARY.

PART I.

DURING the last five or six months I have seen a number of cases in which paralysis of some of the cranial nerves has been a prominent feature. The cases have been sufficiently numerous, indeed, to warrant the application of the term epidemic. It has been suggested by Professor Hall, of Sheffield, and others in the lay and medical press, that these are, or may be, cases of "botulism," a disease which has been attributed to the eating of food—particularly uncooked ham and sausage—infected with the *B. botulinus*. It is conceivable that the bacillus may effect a lodgement in the alimentary tract without producing any definite gastro-intestinal symptoms, and that the toxin there produced, circulating in the blood, might select for attack certain cranial nerves as does the toxin of diphtheria. But there is little, if any, evidence to connect the recently recorded attacks with any special articles of diet, and the epidemic, in its widespread character, does not resemble that usually associated with poisonous food, but rather suggests the type associated with symptom-free carriers, as is almost certainly the case in poliomyelitis, and in cerebro-spinal fever.

I had, indeed, concluded in my own mind that I had to deal with an epidemic of infective polioencephalitis, using that term to designate an affection of cranial motor centres produced by the same elusive organism that gives rise to epidemic poliomyelitis, and I have expressed that belief in the title of this communication. A weak spot in this suggestion is perhaps the fact that I have not met with an undue number of cases of poliomyelitis, such as one would expect to be associated with an epidemic of polioencephalitis, nor has such frequency of poliomyelitis, I believe, been recorded. Further, the possibility of an access of botulism associated with the considerably increased consumption of tinned meats during the period of restricted supply of fresh meat must be kept in mind.

The following are the only cases which I have kept any available notes. The first does not belong to the present series since it is one that came under my observation over four years ago, but it is obviously a sporadic case of the same nature as those now epidemic.

G. M. P., a girl aged 12, was seen in the out-patient department of the Royal Infirmary on August 29th, 1913. She had had pain in the head for four days and "turning of the eyes" for three days. She had been sick the day before. She was taken to the Royal Eye Hospital, where she saw Dr. Clegg, and by him was sent on to the infirmary. There was then paralysis of the left sixth nerve, which gave rise to convergent squint, and she had marked optic neuritis. She was constipated. During the next fortnight she continued much the same; she was sick once and had pain in the head and also in the arms and back, and then it was noticed (September 12th) that she had right facial paralysis, though not complete. By September 19th this facial paralysis was well again, but on October 3rd, though there had been no further sickness or headache, she had facial paralysis on the left side. After this date she steadily improved; the paralysis gradually passed off, though there was partial atrophy of the left optic nerve.

I showed this patient at the meeting of the Neurological Society held in Manchester in May, 1914, as probably a case of cerebral tumour that had made a good recovery, but the general view of those who discussed the case was that it was one of polioencephalitis, and that the time of year at which it occurred lent support to this view, since August and September are the months in which poliomyelitis and polioencephalitis are most frequent and occasionally assume an epidemic form.

Of the more recent cases which fall into the epidemic group the following are brief notes:

CASE I.

A. S., a boy aged 16, sent to my out-patient department on November 22nd, 1917, by Dr. Senior of Levenshulme. He had been suffering from left-sided facial paralysis for about a week; he had noticed it first on getting up in the morning, and had attributed it to draught from the window at night. He had slight pain in the left side of the face. All the branches of the nerve, both the upper as well as the lower, were involved. In addition, there was paralysis of certain branches of both third nerves on both sides, the right internal rectus and both internal and external recti of the left eye being involved; there was no optic neuritis. There was little, if any, general disturbance. The paralysis got well in about another week—so rapidly, indeed, that Dr. Senior, who had at first feared cerebral tumour, was inclined to regard the condition as hysterical. Some weeks later he had a slight transient recurrence.

CASE II.

B. J., a boy aged 13, an out-patient at the Royal Infirmary, had facial paralysis on the right side, starting about December 20th, 1917. There was but little local pain or discomfort, and no general symptoms. There was no clue as to the origin of the paralysis. He very rapidly improved under the potassium iodide and sodium salicylate, and was discharged cured by February 21st.

CASE III.

G. T., a girl aged 12, seen in my out-patient department on March 28th, 1918, was taken ill about January 14th, 1918, with drooping of both eyelids and pains in the head, particularly at the back of the eyes. She had no vomiting, but had pyrexia, with some delirium and clouded consciousness. She was an in-patient in succession at the Eye Hospital, the Royal Infirmary, and the Convalescent Hospital. When she came under my care on March 28th there was still some drooping of the eyelids, though they were better than they had been, and there was divergent squint due to paralysis of the left internal rectus. There was no optic neuritis in this case.

CASE IV.

I. A., a girl aged 14, seen in consultation with Colonel Coates on March 25th, 1918. She had some headache about Christmas, 1917, which was put down as probably the result of a fall on the back of the head shortly before. The headache continued off and on for some weeks, but latterly she had had no trouble with it to speak of. Five weeks back, however, she had begun to see double, and Dr. McNabb found that she had optic neuritis and paresis of the right external rectus. During the whole period during which she had the headaches she had not seemed well of herself, but had not been in any way acutely ill, and when I saw her in March, except for some degree of anæmia she appeared in her normal health. The optic neuritis is now (May 11th) clearing up, and the diplopia and paresis of the left external rectus are now well.

CASE V.

W. B., aged 21, came as an out-patient to the Royal Infirmary on April 4th, 1918. He had had a left facial paralysis, coming on without ascertainable cause about ten days previously. He improved very satisfactorily under treatment, and was discharged cured on May 2nd. He never showed any other local or general symptoms beyond the facial paralysis.

CASE VI.

A. C. W., aged 33, a signalman, seen in the out-patient department of the Infirmary on the same date as the above. He had had right facial paralysis, coming on without ascertainable cause, about eight days previously. He has failed to respond to treatment, and up to date (May 2nd) has made practically no improvement.

CASE VII.

E. C., aged 42, seen in the out-patient department at the Infirmary on April 11th, 1918. She had had weakness of the left eyelid coming on gradually for three weeks. She had had headache, but not very severe. On examination, there was complete ptosis on the side, with no affection of any other eye muscles; the pupils reacted normally, and fundi and fields were normal (Dr. J. G. Clegg). She has improved slightly, the droop of the left upper lid being somewhat less than it was; no further paralysis has developed.

CASE VIII.

M. C., aged 41, insurance agent, was sent to my out-patient department at the Infirmary on May 2nd, 1918, by Dr. Blakemore of Tyldesley, with a note suggesting "? commencing disseminated sclerosis." He started with right-sided facial paralysis six or eight weeks ago. He was unable to close his right eye and saw double. The facial paralysis has now practically recovered. He had also some slight drooping of the left eyelid, and this, after getting better for a while, had become worse. When seen there was well-marked ptosis. He still had double vision, and there was paresis of the right internal rectus and of both superior recti. There was no optic neuritis. He had had no general symptoms of illness, and, despite the difficulty of seeing clearly, he had continued at his work with assistance

CASE IX.

M. M., aged 11, seen in consultation with Dr. Barnes of Failsworth on April 28th, 1918. She had been ill for about fourteen days with pain in the head and mild pyrexia, about 100° F. The pain was mostly about the back of the head and neck, and there had been distinct stiffness of the muscles at the back of the neck. She had vomited once, and the tongue was dirty. There had been a good deal of general malaise, but when I saw her she was better and was sitting up in bed reading and anxious to be allowed up. There was no paralysis of any of the face muscles, nor any complaint of double vision, but she had well-marked double optic neuritis. On May 5th Dr. Barnes informed me that she had since complained of double vision, though there was no recognizable ocular paralysis. The optic neuritis is now beginning to clear up.

CASE X.

Mrs. W., aged 61, seen in consultation with Dr. McLean of Harpurhey on March 20th, 1918. She had had gradually progressive asthenia for two or three weeks with slow mentality and forgetfulness, and slight continued pyrexia. It was difficult to get her to answer any questions about herself, though after I had been with her for a time she roused up to a certain extent, and took some interest in my visit. There was no paralysis of cranial nerves then, and no optic neuritis, but she subsequently developed facial paralysis. She gradually got worse, and sank into a more and more confused and asthenic condition, and died about a fortnight later.

CASE XI.

Mrs. P., aged 62, also seen in consultation with Dr. McLean of Harpurhey on April 3rd, 1918. She had had symptoms of arterio-sclerosis—recurrent headache and dizzy attacks—for two or three years past. For some days before I saw her she had been suffering from headache, and had been dull and confused, and the day before sudden ptosis of the left eye had developed, and she had diplopia, due to fairly complete paralysis of all the straight muscles of the left eye. She complained of a good deal of pain and headache above the eye, made worse on examining for optic neuritis, which was absent. The urine was free from albumin. She had gradually improved, but on May 5th there was still some drooping of the left lid and diplopia.

With the exception of Mrs. W. (Case x) and of G. T. (Case III), the general symptoms have been comparatively slight, certainly not of the severity suggested by Professor Hall in his brief note of the cases he has seen in Sheffield. It would appear as if most of the cases I have seen were of a subacute type.

I have had some doubts as to whether the three cases of simple unilateral facial paralysis should be included, since they differed in no way from the sporadic cases with no ascertainable cause that are of fairly common occurrence. In view of their unusual frequency, however, and of the belief which I know is held by some physicians that facial paralysis is not uncommonly an expression of polio-encephalitis, I have thought well to retain them.

I have some doubts also of the exact nature of the two following fatal cases. In neither of them was there any cranial nerve paralysis, but the progressive asthenia and drowsiness, advancing to coma, without definite evidence of meningitis, have inclined me to believe that they fall into the same category. I may say that I have during the period come across (but not had under my own care) several cases of similar type, some of which have ended fatally, whilst others have got well after being in apparently a dying condition for some days.

CASE XII.

Mrs. N., aged 28, seen with Dr. Kenny of Pendleton on February 16th, 1918. She had started about February 12th with symptoms suggestive of a mild influenzal attack and a temperature of 100° F. On February 13th she was better, but on February 14th complained of headache and began to be drowsy, and when I saw her she was unconscious, though she showed that she could just feel firm nipping of the skin between one's finger nails. Her pulse was fast (120), breathing not faster than normal. There was nothing abnormal to be discovered in the heart, lungs, or elsewhere. The urine was normal. There was no paralysis, and no optic neuritis. Her state of coma steadily deepened, and she died a few days later.

CASE XIII.

L. W., aged 22, seen with Dr. Barnes of Failsworth on March 19th, 1918. She had been ill for about a week, having started with chest symptoms—cough, rapid breathing, and pyrexia. For two or three days before I saw her she had been getting progressively more drowsy and weaker, and finally could not be roused at all. The urine was normal. There was no paralysis, no convulsions or twitching, but as I suspected tuberculous meningitis I took her into the Royal Infirmary under my care. Lumbar puncture yielded clear fluid under moderate pressure, which did not yield any pathological organisms on culture, and did not show the presence of tubercle bacilli or *Diplococcus intracellularis*. Her temperature remained high and her coma gradually deepened till she died, two days later. The autopsy revealed purulent bronchitis and acute pulmonary emphysema, but there was no meningitis nor any recognizable naked-eye abnormality of the brain or meninges.

NEPHELOMETRIC ESTIMATION OF QUININE IN BLOOD AND URINE.

BY

I. J. LIPKIN, M.B., CH.B., M.R.C.S., L.R.C.P.,

JOHNSTON FELLOW IN BIOCHEMISTRY,

AND

W. RAMSDEN, M.A., D.M.,

PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LIVERPOOL.

THE methods recorded below were devised, amongst others, in the course of work undertaken at the request of the Medical Research Committee. They are published at once in the hope that they will be useful to others who are investigating the treatment of malaria by quinine. A fuller account of these and other methods will appear in the *Annals of Tropical Medicine and Parasitology*.

By the following procedure estimates of small fractions of a milligram of quinine can be made with an error of less than 5 per cent. It has been found invaluable in dealing with such small amounts of the alkaloid as are contained in 5 c.cm. of human blood, when no other methods would have the necessary delicacy. It has also, by reason of its rapidity, proved very useful for approximate estimations of quinine in urine. Its success is due (1) to the great delicacy given to the Tanret turbidity test by using purified ether and by dissolving the quinine in saturated ammonium sulphate solution; (2) to the observation that comparisons of the opalescences of two suspensions can be made with greatly increased accuracy when the tubes are illuminated by a band of light admitted through a narrow adjustable slit.

Estimation of Quinine in Blood.

Five to ten cubic centimetres of blood are removed from the patient by a syringe, ejected at once into a weighed flask containing 2.5 to 5 grams of solid ammonium sulphate and 10 c.cm. of a saturated aqueous solution of this salt containing 0.6 per cent. H_2SO_4, and the flask is re-weighed. Boil for two minutes, shaking all the time, and pour off the liquid portion while hot into a small Gooch crucible under suction. Catch the filtrate in a test tube and transfer it to a 50 c.cm. stoppered cylinder. Add 10 c.cm. more acidulated ammonium sulphate solution to the original flask, boil and filter as before. Wash the residue on the crucible twice with the hot filtrate before adding it to the original filtrate. Repeat the boilings with three further lots of acidulated ammonium sulphate solution, on each occasion washing the residue on the crucible two or three times. Cool the filtrate, alkalize it with strong ammonia and extract with four 7 c.cm. lots of purified ether (*v. infra*), removing each lot as it separates, and transferring it to one of a special series of test tubes gauged for nephelometry. Evaporate off the ether on a hot water bath, taking care to avoid loss by spurting—the tube now contains the whole of the quinine of the original blood. Control experiments with normal blood have shown that it contains no substance giving turbidity with Tanret's reagent. The test tubes are of thin-walled colourless glass, and have a diameter of about 13 mm. They are carefully selected so as to be equal in calibre in the lowest two centimetres of the cylindrical portion, this equality being ascertained by means of a suitably thick piece of glass tubing surrounded at its lower end by a half-centimetre length of thick black rubber tubing.

The nephelometer consists essentially of a well made dull-black parallel ruler, the lower bar of which is screwed horizontally to a wooden supporting open framework (for example, a photographic half-plate printing frame), which bears also a small shelf level with the lower edge of the ruler. By means of vertical cardboard screens light is blocked off from all but a middle portion of the slit two test tubes wide. The light should be strong. Between it and the slit is interposed a piece of opal glass or white semi-transparent paper. The ends of the test tubes rest on the transverse shelf referred to above, their sides are

kept in close contact with the face of the ruler by means of rubber bands or brass springs screwed to the ruler or the frame.

Observations should be made in a dark room, and the width of the slit giving optimum results should be chosen empirically. The light should be fixed in position relative to the slit.

The quinine obtained from the blood is dissolved in 10 c.cm. of saturated ammonium sulphate solution, and 5 c.cm. of the solution transferred to another of the gauged test tubes. Into five other test tubes of the series are introduced 5 c.cm. of various standard solutions of quinine in saturated solution of ammonium sulphate of strengths increasing from 1 mg. in 500 c.cm. to 1 in 100 c.cm. To each of the six test tubes is then added 0.05 c.cm. of Tanret's reagent and thoroughly mixed at once by shaking. After a quarter to half an hour the tube is "matched" with the standards in the nephelometer, and thereby an approximate idea of the strength of the quinine is acquired. If this is less than 1 mg. in 500 c.cm. the turbidity will be too slight for any but very rough estimation. If more than 1 mg. in 100 c.cm., dilute the remaining 5 c.cm. of quinine solution with 10 c.cm. of saturated ammonium sulphate solution, take 5 c.cm. of the diluted solution and add Tanret's reagent, mix thoroughly, and match with a series of fresh standards. The dilutions at which we find our judgement of turbidity most accurate, using 13 mm. test tubes, lie between 1 mg. in 200 and 1 in 300 c.cm. The final matchings are made with a series of standard quinine solutions of which the strengths decrease from 1 mg. in 200 c.cm. to 1 in 300 c.cm.

Results Obtained with Pure Quinine.

The alkaloid was given dissolved in a saturated watery solution of ammonium sulphate; 5 c.cm. of the solution was taken for each estimation.

Given Milligrams in 5 c.cm.	Found Milligrams in 5 c.cm.	Percentage Error.
0.0200	0.0192	− 3.9
0.0222	0.0217	− 2.2
0.0233	0.0227	− 2.3
0.0222	0.0217	− 2.2
0.0192	0.0189	− 1.7
0.0200	0.0200	Nil
0.0200	0.0202	+ 1.0
0.0250	0.0254	+ 4.2

The observer did not know the correct results beforehand. Those shown above were obtained in a preliminary trial with test tubes gauged only externally.

We have no doubt they can be improved on, and also that, with suitable flat-bottomed tubes 2.5 c.cm. of solution would suffice, in which case it would be possible to estimate $\frac{1}{500}$ mg. of quinine with the same degree of accuracy.

Results with Defibrinated Sheep's Blood to which Known Amounts of Quinine Solution had been added.

Five cubic centimetres of blood were used for each estimation.

Milligrams of Quinine given in 5 c.cm. of Blood.	Milligrams Found.	Percentage Error.
0.0303	0.0312	+ 3.1
0.0200	0.0192	− 3.8
0.0200	0.0196	− 2.0
0.0178	0.0172	− 3.5

The amounts shown are such as do actually occur in the blood of patients taking large doses of quinine.

Nephelometric Estimation of Quinine in Urine.

To every 100 c.cm. of urine add 5 c.cm. of 25 per cent. solution of neutral acetate of lead, containing also 2½ per cent. of acetic acid. Mix and then add 5 c.cm. of saturated watery solution of ammonium sulphate. Filter until a clear filtrate is obtained. Test it for absence of lead by receiving a drop on filter paper moistened with a sulphide solution. If lead is found (very exceptional), the above defaecation process must be omitted, although troublesome emulsions with ether may then be expected. Reckon 100 c.cm. of filtrate as representing 92.3 c.cm. of the original urine.

Test the filtrate with Tanret's reagent; if it gives any turbidity, dilute it with known volumes of water until it just ceases to do so. This is necessary because the 10 c.cm. of saturated ammonium sulphate solution added to the quinine extracted will dissolve only about 1 mg.

Take 10 c.cm. of this "defaecated" (and, if necessary, diluted) urine in a small stoppered cylinder, and filter; dissolve in it 5 grams of ammonium sulphate. Extract with three successive 7 c.cm. lots of purified ether, and so get rid of any "oily matter." Alkalize it with strong ammonia solution, and extract the quinine with three successive lots of ether, transferring each lot as removed to one of the gauged test tubes. Then proceed as already described for blood estimation.

Estimation of Quinine in Urine.

Milligrams of Quinine given in 10 c.cm. Urine.	Milligrams of Quinine found in 10 c.cm. Urine.	Percentage Error.
0.1000	0.0995	− 0.5
0.0588	0.0552	− 6.1
0.0833	0.0832	− 0.2
0.1205	0.1232	+ 2.2
0.0400	0.0401	+ 0.2

Tanret's Reagent.

Dissolve 1.35 grams of mercuric chloride in 70 c.cm. of water, and 5 grams of potassium iodide in 20 c.cm. of water in a 100 c.cm. measuring flask. Pour the mercuric solution into the iodide solution under agitation and fill up with water to the mark.

Purification of Ether.

One litre of methylated ether is shaken up thoroughly for five minutes with four successive 100 c.cm. lots of saturated aqueous solution of sodium bisulphite in a separating funnel, allowing half an hour for each separation before running out the watery solution. Wash with 50 c.cm. of half-saturated sodium chloride solution. The ether is then shaken with 50 c.cm. of water *plus* a little phenolphthalein and enough sodium hydrate solution to give a permanent alkaline reaction. The separated ether is further purified by distillation. It must give no reactions for aldehydes or ketones, as otherwise a Tanret turbidity with the residue of an ether extract would be inconclusive, and nephelometric estimations of quinine would be inaccurate.

As a supremely delicate test for ketones the mercuric cyanide reagent of Scott Wilson can be strongly recommended. As a test for aldehyde (probably much less sensitive) the well-known Schiff's sulphurous acid fuchsin solution may be used.

The ultimate criterion should be that no turbidity develops when the ether is shaken with *excess* of the Scott Wilson reagent.

Scott Wilson Reagent.

Mercuric cyanide	0.5 gram
Sodium hydrate	9.0 grams
Water	60 c.cm.
0.7268 per cent. silver nitrate solution ...	20 c.cm.

The mercuric cyanide and NaOH is dissolved in water, and the silver solution is run in under constant stirring.

THE American National Board for Vocational Education estimates that 100,000 of every 1,000,000 soldiers sent to Europe will return during the first years of the fighting, and that 20,000 of these will need some kind of vocational re-education. A comprehensive Federal scheme for training and placement in wage-earning occupations has been drawn up which includes a central administrative agency in Washington with similar public, semi-public, and private agencies, and the establishment of "curative workshops for the treatment of war cripples, together with a complete system providing for subsistence and pay during the period of re-education."

STERILIZATION OF THE SKIN AND OTHER SURFACES BY A MIXTURE OF CRYSTAL VIOLET AND BRILLIANT GREEN.

BY

VICTOR BONNEY, M.S., M.D., B.Sc.Lond., F.R.C.S.Eng.,

ASSISTANT GYNAECOLOGICAL SURGEON TO THE MIDDLESEX HOSPITAL AND SURGEON IN CHARGE OF ITS MILITARY BRANCH AT CLACTON-ON-SEA,

AND

C. H. BROWNING, M.D., D.P.H.,

DIRECTOR OF THE BLAND-SUTTON INSTITUTE OF PATHOLOGY, THE MIDDLESEX HOSPITAL.

The problem how to effect absolute sterilization of the skin is of the utmost importance in surgery, but it is difficult of solution because all the usually employed antiseptics are more or less strongly irritant, so that their prolonged application for the purpose of seeking out organisms lying beneath the superficial layer of epithelial squames, or sequestered in the sweat and sebaceous glands and the hair follicles, is impossible. Their action is thus limited to the surface of the skin only, and those organisms which lie deeper escape destruction. Moreover, they are rendered inactive by admixture with albuminous substances, so that the blood from the wound, on coming in contact with the prepared skin, immediately neutralizes the small amount of the antiseptic. For example, every trace of the iodine colour has disappeared from the neighbourhood of the wound long before the operation is finished.

It may be argued that the iodine has already sterilized the skin, but this would only be true if the sterilization extended throughout the bacteria-bearing regions of the skin, whereas it is limited to the surface. The result is that the rubbing of the soddened skin surrounding the wound, which is more or less inevitable as the operation proceeds, first removes the layer of superficial sterility and then begins to detach epithelial scales which the antiseptic has never reached. The conveyance of such unsterilized squames into the wound is a potential cause of sepsis.

To avoid such conveyance the modern surgeon attaches sterilized towels to the edges of the wound. Fixation of the towels so as absolutely to cut out the skin is simple in straightforward operations where little manipulation of the wound is needed, but quite the reverse in certain prolonged and difficult operations involving much manipulation, and it is in such that perfect aseptic technique is most particularly desirable. The use of sterile towels to cut out the skin has the further disadvantages that they add a complication to the general technique, tend to handicap the surgeon, and increase the expense—a matter of no small moment to hospitals nowadays.

One of us (V. B.) carried out a number of experiments aiming at cutting out the skin surface altogether by covering it with a layer of impermeable varnish; a number of varnishes were used, the basis of them all being asphalte dissolved in various volatile media, to which was added in different experiments mastic, collodion, and caoutchouc. The experiments failed; although the desired result was attained so long as the skin was smooth and dry, yet when it was sweaty or crinkled, as in the case of the abdomen of parous women, the varnish before the close of the operation began to peel off at the edges of the wound.

In consequence, one of us (C. H. B.) suggested the use of a strong solution of crystal violet and brilliant green to produce not only a sterile, but an actively antiseptic condition of the skin, since these substances are both extremely potent antiseptics,[1] and at the same time devoid of irritating effect on the skin when applied in high concentrations. The method which we have employed, and which has been used as a routine at the Middlesex Hospital by one of us (V. B.) for the last two and a half years, is as follows:

The solution contains 1 per cent. of a mixture of equal parts of crystal violet* and brilliant green† dissolved in equal parts of rectified spirit and water. (The powder is dissolved in the undiluted spirit first of all and the water then added.) Six hours before the operation (except in certain cases) the solution is painted over the skin of the operation area; a compress of lint soaked in the same and covered by a sheet of waterproof batiste, is then applied and kept in position by a binder or bandage. This compress is removed on the operating table and no further painting done. The result is that the skin is stained an intense violet-black; the staining remains unchanged throughout the operation and indeed for a week or two afterwards.‡ This prolonged application of the antiseptic produces no irritation of the skin, nor of more sensitive surfaces such as the vulva and vagina.

The theoretical advantages of an antiseptic capable of being applied in such concentration and over such a period are obvious. The epithelial squames throughout the entire thickness of this layer become permeated with the dyes. Should a squame become detached and conveyed into the wound it carries with it a definite amount of a potent but practically non-irritating antiseptic, and the skin surface exposed is not merely initially sterilized, but remains antiseptic throughout the operation.

The clinical results accord with the theoretical. The advance made is chiefly apparent not in the average surgical case in which healing was rarely unsatisfactory with the older methods, but in certain operations in which infection of the wound is specially liable to occur. Thus the healing in cases of the radical extirpation of carcinoma of the cervix, an operation in which suppuration in the operation area has been a not uncommon complication, has immensely improved. In these patients not only is there a special liability to transference of skin organisms into the parietal wound on account of the prolonged operation and the amount of manipulation required, but there is a very definite risk of virulent organisms being transplanted from the divided vagina into the operation area. Various methods aiming at preliminary sterilization of the vagina have been employed in the past, but none of them has been so successful as that we now employ—namely, packing the vagina for six hours beforehand with gauze soaked in violet-green.

Further, a marked advance has been shown in the progress of cases of operations involving the perineal, perianal, vaginal and vulval regions, areas the sterilization of which has hitherto been impracticable. Owing to the absence of irritant effect violet-green can be applied to these parts by compress or pack for the same length of time as it can be applied to the abdomen, the leg, or the arm.

Bacteriological Tests.

In order to test bacteriologically the value of violet-green as a skin sterilizer we have made cultures from a series of patients prepared for operation with this antiseptic. The cultures were taken in the following manner: With a sharp needle the skin was deeply scratched, not merely stroked, and the surface of an agar plate inoculated; the needle was then resterilized, the skin again scratched, and the plate again inoculated, and so on up to four times for each case. The object of this procedure was to obtain cultures, not merely from the surface of the skin, but from the deeper epithelial layers, and, further, to make the inoculation from each separate scratch act as a control to the others on the same plate. In each patient two areas of skin were chosen, the abdominal skin and the perianal skin, and separate plates were used for each area. The perianal skin was specially selected as being the most bacteria-laden portion of the external surface of the body, and therefore as testing the efficacy of the sterilizing agent in the most rigorous manner.

The violet-green was applied to the abdominal skin for six hours in the manner already described, but only for three hours to the perianal and perineal regions, so as not to interfere with micturition. Our results are as follows:

Violet-green—abdominal skin	22 cases
Result: No growth at all in	22 ,,
Violet-green—perianal skin	20 ,,
Result:	
No growth at all in	17 ,,
Growth in two of the four streaks in ...	1 case
Growth in one of the four streaks in ...	2 cases

The growths that occurred in the last two cases were due to the needle being drawn absolutely through the

* The substance employed should be hexa- or penta-methyl violet or a mixture of these.

† Specified as brilliant green sulphate zinc-free.

‡ If desired the colour may be removed by rubbing the surface with hypochlorite solution, for example, "eusol."

anus, a recess into which it is impossible to be sure the antiseptic has thoroughly reached. The streaks corresponding to such passage of the needle showed growth, whilst the others did not. This mistake was avoided in the control experiments.

The following control experiments were carried out:

The perianal skin was untreated in 6 cases. Result: Growth in all four streaks in all cases.

The perianal skin was treated with iodine in 10 cases. The skin was painted with 2 per cent. iodine solution in rectified spirit one hour beforehand and again painted immediately before making the cultures—three streaks only to each case.

Result:	
No growth at all in	1 case
Growth in all three streaks in	3 cases
Growth in two streaks in	3 ,,
Growth in one streak in	3 ,,

The very marked superiority of violet-green over the commonly used iodine is strikingly demonstrated.

For further experimental proofs of the superiority of the violet-green mixture as a means of effecting both thorough and rapid sterilization of the skin we are indebted to the observations of Drs. J. Walter McLeod and R. E. Bevan Brown (unpublished).

The method which these workers adopted was to cut a portion of skin from an amputated limb into portions, which were then placed in sterile Petri capsules. A loopful of a dense emulsion of bacterial culture, faeces, etc., was smeared on the centre of each piece and the surface was allowed to dry. Then the antiseptic was applied either by dropping it on to the surface or by laying on the skin a small piece of lint soaked in the antiseptic solution. At the end of the period of application excess of antiseptic was washed off with spirit and the latter was allowed to evaporate; after the surface had dried, a loopful of sterile peptone water was vigorously rubbed over the treated surface, and the loop was then used to inoculate the test medium. By the application of violet-green, skin inoculated with emulsions of faeces or of soil was completely sterilized, as tested both in aërobic and anaërobic cultures, after twelve to fifteen minutes; *B. tetani* and two strains of *perfringens* type were also killed in fifteen minutes. A 2½ per cent. solution of iodine in spirit was equally effective under similar conditions; but when iodine in 1 per cent. strength was tested on *B. perfringens* it was found to be a less efficient antiseptic than violet-green. The superiority of violet-green was also strikingly apparent in the case of certain resistant organisms; thus, a sporing aërobic bacillus of a type akin to *B. subtilis*, which was very resistant to sterilization by heat, was not killed after ten minutes' application by such practically impossible antiseptics as a saturated solution of iodine in chloroform, 33 per cent. bromine in chloroform, formaldehyde (40 per cent.), liquefied carbolic acid, 5 per cent. hydrochloric acid in saturated watery solution of corrosive sublimate, or 10 per cent. nitrate of silver; 5 per cent. picric acid in spirit, 10 per cent. lysol, 2 per cent. hypochlorous acid, 15 per cent. nitric acid in spirit, also failed to effect sterilization in five to ten minutes; strong tincture of iodine applied for one hour had no obvious effect on this organism, but after twelve hours' application produced sterility. On the other hand, the violet-green solution sterilized the skin after acting for fifteen to thirty minutes.

Streptococci and staphylococci are among the most susceptible organisms to these dyes, hence the above results apply *a fortiori* to those organisms.

REFERENCE.
[1] Browning, *Applied Bacteriology*, London, 1918.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

MYOPIA AND MYOPIC ASTIGMATISM IN RELATION TO THE GLARE OF MESOPOTAMIA.

DURING at least nine months of the year the glare experienced in Mesopotamia is a very real trouble. It is with a feeling of great relief that the first rain is greeted; it comes in December and reduces the glaring white of the soil to a muddy brown colour. The country round Basra consists of the river, the Shatt-al-Arab, with a belt of palm trees of varying depth, and then the desert. The date palm is practically the only tree in this part of the country, and its fruit is the principal wealth of the land, but it is an unsatisfactory tree for giving shade, and is usually so covered with dust as to have a greyish colour which gives no rest to the eyes.

The troops are supplied with glare protectors fitted with a green-tinted glass. There can be no question of the comfort that these afford and of the feeling of coolness experienced on putting them on. Some medical men have asserted that the wearing of glare protectors is as important a prophylactic against heat-stroke as a sun helmet. This, I think, is far too positive a statement. It is generally accepted, after the experience of last summer, which was an unusually severe one, that when a man who has not unduly exposed himself to the sun is attacked by heat-stroke of the apoplectic form he is at the time suffering from some form of toxaemia. In this area the cause of the toxaemia was usually the early stages of sandfly fever or malaria, but alcoholism and even constipation were often the underlying factor.

The point which I wish to bring forward is that persons with myopia, and especially with myopic astigmatism, suffer to a very marked extent from the glare, often to such an extent as to render them useless for any outdoor employment. Men with high degrees of myopia in this country are of little use. Even with glare protectors over their correcting glasses or with tinted lenses, they cannot cope with the conditions.

I will report one case of rather exceptional severity, though cases of a similar nature but of less severity came to the eye department at Basra.

Pte. S. stated (May 21st, 1917) that on the previous day, when coming out from church into the sun, he suddenly saw colours and then became blind. He was taken indoors, and in a few minutes he recovered his vision. Shortly after this he went again to the parade ground, when his sight went in a similar manner and has not returned.

On examination, the vision of the right eye was only bare perception of light, and with the left he could count fingers at a few feet. There was some slight conjunctival injection and considerable photophobia. Both pupils were equal and reacted normally. The eyeballs were somewhat tender to pressure, but the tension was normal. He was wearing −7 D. spher. before both eyes. His refraction worked out at −6 D. spher. −2 D. cylinder axis horizontal for both eyes. The fundus of each eye showed a typical myopic appearance with large temporal crescents, but no active disease was seen. The media were clear.

He was admitted to hospital on the same day, put to bed in as dark a corner of the ward as possible, and given a strychnine mixture three times a day. By the end of a week the photophobia and conjunctival injection had disappeared, and the vision had returned completely. He was subsequently evacuated to India.

I am indebted to Lieut.-Colonel Gee, I.M.S., in whose hospital the ophthalmic department is situated, for permission to publish this case.

P. G. DOYNE, F.R.C.S., Captain R.A.M.C.T.,
Ophthalmic Specialist Base, M.E. Force.

PADDING THOMAS EXTENSION SPLINTS BY PARAFFIN WAX.

I WISH to bring under the notice of surgeons using the Thomas extension leg splint a rapid method of padding the groin ring. It consists in first padding the iron ring in the usual way by winding on to it strips of carpet felting about 1½ in. in width. Each layer as it is wound on is sewn with thin thread to prevent it unrolling or shifting its position, and each successive layer is sewn through to the preceding one. The last quarter of an inch of the padding should be flannel or flannelette sewn in the same manner, and continued until the padding is of the required size and shape.

The whole ring is now immersed in melted paraffin wax, or this is poured over it hot until it permeates the whole padding. When dry and hard all excrescences can be shaved off and the waxed surface rubbed smooth. No leather or other covering is used. It is greasy but clean and does not stick to the skin, and is impervious to moisture. The heat of the body keeps the padding in a soft resilient state, and it moulds itself slightly to the body. If soiled it can be washed, or scraped, or shaved to clean it.

R. LANE JOYNT,
Dublin, Lieut.-Colonel R.A.M.C.

RECURRENCE OF BILIARY OBSTRUCTION BY GALL STONE AFTER REMOVAL BY OPERATION: ACUTE PANCREATITIS: DEATH.

A VERY stout man, aged 53, was admitted to the Royal Infirmary, Glasgow, under my care, on November 26th, with distension of the abdomen, which was tender all over; the bowels had not acted for six days. Tenderness to pressure was most marked over the right hypochondriac

region. The patient was slightly jaundiced, and the stools passed after admission were clay-coloured. He gave a history of having had a shock a year prior to admission, the whole right side being paralysed for a time. He recovered from this, but the action of the bowels was very irregular from that time onwards. A few days prior to admission he passed a large gall stone.

The ordinary cholecystostomy operation was performed, three large and rather soft stones being removed. Care was taken both by palpation and passing a long probe along the duct to ascertain that no stone or other obstruction was left behind. A large tube was left in the gall bladder, from which a copious flow of green bile was discharged; the jaundice disappeared, and the motions were now bright yellow in colour. The patient was thus very well for several days after the operation, and the flow of bile in both directions, was abundant.

Shortly after the administration of a liver pill containing acid sodium oleate, etc., he again complained of pain in the region of the liver—much more severe, on this occasion; he became markedly jaundiced, and the stools were clay-coloured once more. He died shortly after.

On *post-mortem* examination a stone was found impacted in the papilla of the common duct, which projected prominently into the duodenum. The liver was soft and fatty. There was marked acute pancreatitis, due probably to the blocking of the duct by the gall stone, and extensive fat necrosis.

It would appear almost certain, both from the results of the careful examination made at the operation, and the free flow of bile both into the bowel and through the tube after the operation, that the stone found *post mortem* came down from one of the bile ducts of the liver, whence, probably, it had been dislodged by the action of the pill. The stone blocking the ampulla of Vater was responsible for the return of jaundice and clay-coloured stools, while it also probably caused a flow of bile along the pancreatic duct thereby setting up the pancreatitis from which the patient died.

John A. C. Macewen, M.B., C.M.,
Acting Surgeon, Glasgow Royal Infirmary;
Visiting Surgeon, Glasgow District Hospitals.

A CASE OF ADENOMA OF THE UMBILICUS.

A boy, aged 5, who had, since birth, in the lower half of the umbilicus, a red, raspberry-like tumour, which had persisted in spite of pad pressure and applications of ointments and powders, presented when first seen a red, smooth, oval tumour at the lower border of the umbilicus; its longest diameter was half an inch; it projected one-eighth of an inch above the level of the skin. Except for very slight moisture, there was no secretion from the tumour.

Operation.—The tumour was diagnosed to be an adenoma. The umbilical skin was everted with toothed forceps, and the growth, with a ring of surrounding skin one-eighth of an inch in width, was excised. A probe failed to demonstrate any sinus or canal, but at one spot passed through the thin connective tissue into the peritoneal cavity. A mattress suture approximated the sides of the everted umbilicus. Recovery was uneventful.

Pathological Report.—The following is Captain W. L. Pethybridge's report on his microscopical examination of the tumour:

> On longitudinal section, the growth is seen to be an adenoma, attached to a fibrous stalk. At the point of junction of the two parts is a constriction the cavity of which is occupied by squamous epithelium, which also extends for a short distance over the free surface of both the adenoma and the stalk. The glands of the adenoma are tubular, are lined with columnar epithelium, and resemble the glands of the small intestine. They open on the free surface of the tumour. Beneath the glands are bands of unstriped muscle fibres. In places there is some round cell inflammatory exudation.

Remarks.—The condition is one of the abnormalities which result from incomplete obliteration of the vitelline duct, of which the best known is the Meckel diverticulum. In cases such as the above a short piece of the vitelline duct, where it passes through the umbilicus, fails to become obliterated. As the umbilicus closes in, the shallow funnel becomes everted and forms a red velvety tumour, the covering of which is practically intestinal mucosa.

C. Hamilton Whiteford, M.R.C.S., L.R.C.P.
Plymouth.

Reports of Societies.

MOUTH INFECTIONS IN RELATION TO INTESTINAL INFECTIONS.

At a meeting of the Section of Odontology of the Royal Society of Medicine, on May 6th, the President, Mr. J. H. Badcock, being in the chair, Dr. Nathan Mutch read a paper on infections of the mouth in their relation to those of the gastro-intestinal tract. Almost every organism, he said, which had been identified in the bowel in health or disease had been found also in the mouth or in the food ingested through the mouth. At all times any factor such as alteration in diet, digestion, or motility which changed the conditions in the intestines modified also the bacterial balance. When acidity was excessive the duodenum and jejunum were sterile or contained small numbers of strongly acid-resisting yeasts. When gastric hydrochloric acid was very low the number and variety of jejunal organisms were greatly increased. At lower levels stagnation allowed the destruction of the majority of these bacteria by the minority, which found the environment fitted to their free multiplication. Parasitic strains of bacteria, arising from dental defects and swallowed, might infect the mucosa and prolong constitutional disease for years after the restoration of the mouth to health, as occurred in rheumatoid arthritis. The causal bacteria of chronic intestinal infection could live on living or dead tissue; when conditions in the tissues were adverse they continued as saprophytes on the surface; when the exudates and residues were unsuitable for growth, the race was continued amongst the tissues, so that infection continued until both environments became unsuitable at the same time. This rarely occurred spontaneously, and natural cure was uncommon. Infection, either in the mouth or intestine, depressed the general tone and favoured increased invasion at the other focus. Hence improvement was effected in buccal infections by treatment of the bowels, and vice versa. One of the commonest micro-organisms to establish chronic infective foci simultaneously in the mouth and intestines was *Streptococcus pyogenes longus*. In comparison with bacteria of the *B. coli* group the numbers of streptococci were small, but in disease they might increase greatly until they became the predominant colonic aërobes, in extreme cases replacing the colon bacillus almost completely.

Among the factors favouring streptococcal growth in the digestive tract local delay was the most important. With a delay of six hours, fast-growing cocci increased four-thousandfold. Considering the lower ileum and colon only, deficient assimilation of food in the upper parts of the digestive tract was the second essential factor. The more easily digestible the food and the greater the efficiency of mastication, the poorer were the residues upon which the ileo-colonic flora could rely. The products of meat proteolysis induced much more rapid growth than did the products of casein digestion. Although a rich nitrogenous basis was required for streptococcal growth, the presence of carbohydrate was needed for its dominance over members of the *B. coli* group.

The harmful influences determining the first departure from health were those which gave rise to chronic intestinal stasis, and thereby produced secondary foci of stagnation. The densest stream of harmful streptococcal strains flowed from the mouths of patients suffering from infections of the teeth, gums, tonsils, nose, and pharynx. From centres of saprophytic growth in the chyme of the ileo-caecal region long-chained cocci invaded the mucous membrane, and so opened up new channels for their dissemination in the tissues, where they continued life as parasites, exchanging their strife against rival bacteria for one against the defensive processes of the body. Mouth infection again aided them by inducing negative immunity phases from time to time, and thus allowing them greater opportunity of establishing themselves in the mucosa, and they then spread upwards and downwards. Organisms streamed from the infected mucosa along the lymphatics to the neighbouring glands. Alimentary and systemic infections with streptococci, often glycophilic in nature, were associated with a great variety of minor and major gastro-intestinal disturbances, muscular rheumatism,

rheumatoid arthritis, slight and severe anaemias, chronic ulcerative endocarditis, and chronic nephritis of mixed type, etc.

Treatment of the mouth could do much to benefit a great variety of morbid states, but derangements in the lower alimentary tract imposed strict limits to the degree of improvement which could be effected in this way.

The rational treatment of chronic infective conditions of the digestive tract, such as streptococcal disease, was to attack the mouth infection vigorously by local measures, but at the same time to employ every possible therapeutic measure, whether diet, drugs, operation, massage, or vaccines, for the correction of the lesions in the stomach and intestines.

DISCUSSION.

Major H. P. PICKERILL said that as the result of experiments on animals he had found that the prolonged elimination of the glosso-pharyngeal reflex had had the following effects:

1. The animals died within six months.
2. Their weight equalled one-quarter to one-half that of the controls.
3. Starch and calcium were excreted in excess.
4. The salivary glands were undeveloped (in ratio to body weight).
5. The animals developed a polyneuritis, from which they apparently died.
6. *Post mortem* there were gastric lesions. Ulcers were constant, and there was dilatation and pyloric stenosis.

He had injected endotoxins and exotoxins from the human mouth into the jugular veins of rabbits, and found that endotoxins produced a rise of blood pressure and exotoxins a fall of blood pressure. He had administered daily by the mouth 1 c.cm. of broth culture from carious teeth to rabbits. This was followed by malaise, anorexia, and diminished defaecation, as was shown by human beings with oral sepsis and stasis. He thought the explanation was something as follows: The ingestion of non-acid or alkali substances was followed by glosso-pharyngeal depression, and this in turn by diminished alimentary secretion, oral and intestinal stasis, toxic absorption, and sympathetic nerve stimulation, intestinal dilatation, and viscous, scanty saliva. In this way a vicious circle was formed which could start at any point. Mr. DOUBLEDAY also took part in the discussion, and Dr. MUTCH replied.

BONE GRAFTING IN UNUNITED FRACTURES OF THE MANDIBLE.

AT a meeting of the Clinical Section of the Royal Society of Medicine, held on May 10th, Surgeon-General H. D. ROLLESTON, the President, being in the chair, Mr. PERCIVAL P. COLE showed nine cases to illustrate the results of bone grafting in ununited fractures of the mandible. The cases included examples of free transplants from tibia and rib and several treated by the author's method of employing a pedicled graft derived from the lower jaw itself. The cases were inspected, and the results obtained were regarded as very satisfactory. Mr. Cole, in describing the operation devised and practised by him, said that a thick, well-nourished bone fragment could be detached from the basal margin of the body of the jaw. The blood supply of this fragment was maintained through a muscular pedicle consisting of platysma, deep cervical fascia, and the anterior belly of digastric. The longest fragment thus detached measured 4 cm. The great majority of ununited fractures exhibited a loss of bone that could be bridged easily by a graft of that length. Hence the operation had a wide range of applicability. Owing to the vitality of a graft of this nature results were obtained with more certainty and greater rapidity than by the use of a free bony transplant. Mr. Cole dissented from the view that free transplants failed so frequently that they should only be employed as a last resort. He had had no failure in cases where pedicled grafts had been employed, and was able to record 70 per cent. of successes in cases treated by free transplants.

AT a recent meeting of the principal authorities and leading citizens of Naples a committee was formed for the establishment of a large children's hospital in that city. Professor Antonio Cardarelli, Senator of Italy, was elected honorary president.

Rebiews.

TRANSFUSION OF BLOOD.

IN an interesting historical note in BERNHEIM'S handbook on *Blood Transfusion*[1] the subject is divided into four periods: the first from 1492, when an attempt to save the life of Pope Innocent VIII was made, with the result that the three donors died, up to Carrel's work on the surgery of the blood vessels; the second period of direct transfusion rendered possible by Carrel's genius and developed by Crile's enthusiasm; the third period of indirect transfusion of whole blood by means of Lindemann's syringe and of the methodical determination of the haemolytic and agglutinative relations of the bloods of the donors and recipients; and, lastly, the recent epoch of indirect transfusion with the aid of anti-coagulants. In dealing with the control of haemorrhage the author states that rabbit and horse serum are generally of no value, dismisses calcium lactate as a doubtful prophylactic and of no use when bleeding has started, and points out that too much has been expected from saline solution, examples being given of its failure and of its inferiority to blood transfusion. In the section on the indications for transfusion the lines laid down by Libman and Ottenberg are very closely followed, and reference is made to the suggestion that a systolic blood pressure of 70 mm. Hg is the danger limit which should call for immediate blood transfusion regardless of the other features of the case.

The chief dangers attending blood transfusion are haemolysis and agglutination, the former being by far the more serious; the precautionary tests to be carried out before transfusion so as to avoid these complications are detailed in the appendix, where Moss's classification of human beings into four groups according to their iso-agglutinins is reproduced. Though *a priori* embolism should be common, in practice it is very seldom seen. Examples coming under the author's notice of the transmission of syphilis and of malaria—accidents very rarely reported—are mentioned, and the results of a collective investigation into 800 cases of transfusion are quoted. The details of the method are well illustrated by figures, and the author humorously mentions that he thought he had invented a method which he however found had been actually described two and a half centuries earlier. The sodium citrate method of indirect transfusion, which it is thought will probably supersede the others, is discussed and compared with the results of transfusion of untreated whole blood; paradoxical as it seems, the coagulation time of the patient's blood is shortened, not prolonged, after the transfusion of citrated blood, but a febrile reaction with a rigor follows transfusion of citrated blood much more often than one of untreated whole blood. The various conditions, such as acute haemorrhage and shock, anaemia, haemorrhagic diseases, and leukaemia, for which transfusion is indicated, receive individual attention.

The author had to leave so suddenly for foreign service with the Johns Hopkins Base Hospital unit that he was unable to give his treatise a final revision, and this probably accounts for some delay in its appearance, but he may be heartily congratulated on his useful and practical contribution.

HOSPITAL SHIPS.

IN the preface to his handbook on the *Fitting Out and Administration of a Naval Hospital Ship*,[2] Fleet Surgeon SUTTON, R.N., states that he is writing from an experience of three and a quarter years. The book contains four sections. In the first, allusion is made to hospital ships of the sailing ship era, and a summary is given of the stages by which the modern hospital ship has been evolved. The chief factors which have determined the direction of development in the past are traced, and a forecast made of the directions in which developments are likely to proceed in the future. There is a brief historical account of the

[1] *Blood Transfusion, Haemorrhage, and the Anaemias.* By Bertram M. Bernheim, A.B., M.D., F.A.C.G., Instructor in Clinical Surgery, the Johns Hopkins University. Philadelphia and London: J. B. Lippincott Company. (Pp. 259; 18 figures. 18s.)

[2] *The Fitting Out and Administration of a Naval Hospital Ship.* By Edward Sutton, Fleet Surgeon R.N., S.M.O. R.N. Hospital Ship *Plassy*, etc. Bristol: John Wright and Sons; London: Simpkin, Marshall and Co.: Toronto: The Macmillan Co. of Canada. 1918. (Demy 8vo, pp. 110; 28 figures.)

origin of the Red Cross organization, and the rules by which the employment of hospital ships ought to be governed are given *in extenso*. The uses to which hospital ships may be put in war are stated and possible irregularities discussed, as also the question of confiscation.

The principles which should guide the selection of a mercantile marine vessel for conversion into a hospital ship are discussed under two headings: the choice of a suitable vessel, and the location of specific hospital requirements. To write a useful description of the converted hospital ship is far from easy, but the author's scheme is good. He first devotes a chapter to the steamship *Drina* prior to conversion, and in the succeeding chapter describes the same vessel after conversion. This will be a valuable guide to any one who may have to carry out such a conversion. Every measurement likely to be wanted in the construction of the wards and different special departments—the operating theatres, store rooms, etc.—with all their fittings, seems to be given.

The next section deals entirely with the working organization of a hospital ship. The method of embarking patients is described under four headings: (1) Means of getting the patient (a cot case) inboard; (2) allocation of his bed; (3) registering the occupation of that bed; and (4) stowage of the man's effects. A new and admirable modification of the "service" cot carrier is described; the innovation is that both ends are detachable, and there are wooden rollers on its floor; photographs and a drawing to scale are given. The organization for evacuation is simple and original. By means of a system of labels and discs, which is described in detail, the considerable amount of clerical work necessary for papers which must be sent with patients can be quickly compiled. In any service institution the stores department is very important, and here a novel system is described whereby the fluctuation in the stock of each article is automatically recorded; the same scheme also enables the person responsible for ordering the fresh stores to see at a glance how much of each article is required.

The author has had experience of three separate hospital ships, and this alone entitles him to speak with authority on his subject. His book contains a great deal that is new, and he has displayed considerable genius in evolving a remarkable organization for the working of a hospital ship. The value of the book is enhanced by helpful diagrams and illustrations. It will meet a real want, for we are unaware of any similar publication; we congratulate the author, and confidently recommend his work to the notice of all medical officers—naval or military—who are in any way concerned with hospital ships.

THE GROWTH OF MEDICINE.

THE study of the history of medicine has received a great stimulus in this country by the establishment of a separate section of the Royal Society of Medicine, and there has been a remarkable growth of interest in the subject in America. Recent evidence of this is afforded by a large work compiled by Dr. ALBERT H. BUCK, of the Columbia University, New York, dealing with *The Growth of Medicine*[3] from the earliest times to about 1800. The volume, finely printed and illustrated, is the first of a series to be published at the Yale University Press on the foundation established in 1916 as a memorial to three generations of a family of doctors educated at Yale, the Williams Memorial Publication Fund.

Dr. Buck has succeeded in weaving a valuable account from the many sources of information open to him. His history carries the reader through each period of medical progress or recession with equal interest. From its origin in the East when anatomy was unknown and treatment for most part mystic and in the hands of the priesthood, he traces the dawn of clinical observation and illustration in Greece, and incidentally refers to the practice of offering votive tablets to Aesculapius, some of which have been found to portray the morbid conditions of the petitioner. A most admirable model of a face distorted by paralysis, discovered some years ago and now in a German collection, is given as an illustration. With the era of Hippocrates a great stride forward was made, and all readers of his aphorisms must recognize that many of the rules of conduct laid down for physicians are as applicable at the present day as they were in 400 B.C.

Athens in time gave place to Alexandria as a seat of learning and a great clinical teacher arose in the person of Herophilus; many of the subjects discussed under his auspices have remained undecided to the present day. The varying experience of a vast number of writers has tended to prevent any common agreement. Specialism began to be practised just before the beginning of the Christian era, and once again the chief seat of learning migrated and settled itself in Rome. The most prominent figure of that period was Asclepiades, whose teaching, entirely founded on observation and without means of verification by *post-mortem* examination, contained much that survived through succeeding centuries. In the second century the advent of Galen exercised a great influence upon medical thought and practice. His voluminous writings, which have been so often translated, have been perhaps more highly appreciated by later generations than by the readers and pupils of his own day. Like many other pioneers, he was far in advance of his period, and obviously had that strong belief in himself which has proved essential to great teachers in all times.

To follow Dr. Buck through each successive wave of advancement and recession, to Constantinople, to Persia, and to the final settlement in Northern Italy and Western Europe generally, would call for more space than is available. It must suffice to record that every step forward, or backward, is traced with the same thoroughness, apt quotations being inserted and well-executed illustrations being supplied of many of the epoch-making events, or of the great leaders in many lands. Some medical historical treasures will probably have been destroyed in the library of Louvain, and notably a finely illuminated edition of Vesalius's works, but its fate is at present unknown. Medical literature has suffered much from the incendiary zeal of invaders at many previous periods of history, but although originals have been lost, the copies laboriously executed by monastic and other hands have remained, and Dr. Buck has done a great service in so classifying and bringing together the scattered records as to form a most interesting and valuable history.

[3] *The Growth of Medicine from the Earliest Times to about 1800.* By Albert H. Buck, B.A., M.D., Columbia University, New York. Newhaven: Yale University Press; London: Humphrey Milford; Oxford: University Press. 1917. (Med. 8vo, pp. 582. 21s.)

NOTES ON BOOKS.

THE Central Council for District Nursing in London has issued a *Directory of District Nursing*[4] in London which will undoubtedly be of service to social workers, medical practitioners, and others engaged in the health service of the metropolis. The directory gives the name of practically every street in the administrative county, together with the borough and Poor Law union in which it is situated. For each entry there is a reference number to the index of district nursing associations.

Mr. HAMILTON WHITEFORD has brought together in a small book some practical notes on the diagnosis and treatment of *Acute Appendicitis*,[5] based on his own experience. After dealing with points in the diagnosis, he passes on to discuss questions of treatment, dealing with them under the heads of general principles—pre-operative, operative, and post-operative. This is followed by a note on some post-operative complications. The author is inclined to be didactic on matters which have been much debated in recent years. His general conclusion is that in advanced cases the operator's temptation is to do too much.

[4] *Directory of District Nursing and Streets List for London.* London: The Botolph Printing Works, 8, Gate Street, Kingsway, W.C.2. (2s. 6d.)

[5] *Acute Appendicitis: Practical Points from a Twenty-five Years' Experience.* By C. Hamilton Whiteford, M.R.C.S., L.R.C.P. London: Harrison and Sons. 1917. (Cr. 8vo, pp. 72. 4s. net.)

THE review which is the organ of the Russian Association for the protection of mothers and infants entered on its third year of life at the beginning of 1918. It is published at Petrograd (Nicolaievskaia, 49) in two-monthly fasciculi, which form at the end of the year a goodly volume of six hundred pages. The editor is Dr. P. Medowikoff.

British Medical Journal.

SATURDAY, MAY 18TH, 1918.

MODERN LANGUAGES AND "MODERN STUDIES."

THE report of the Committee appointed by the Prime Minister in August, 1916, to inquire into the position of modern languages in the educational system of Great Britain is remarkable for the definite recommendation that Latin should not be compulsory, even for an arts course, at any university, and that for the Civil Service (Class I) modern languages, with their history and literature, should be placed on an equality with the similar learning of Greece and Rome. The report should be read in connexion with the report of the Committee appointed by the Prime Minister at the same time to inquire into the position of natural science in the educational system of Great Britain, of which we gave some account on April 20th, p. 459. It also arrived at the specific conclusion that Latin should not be retained as an obligatory subject in the examination for entrance to the medical profession. The report of the Modern Languages Committee is all the more likely to have a profound influence on secondary and university education in Great Britain in that its recommendations seem to be in line with the policy set forth in 1913 by the Board of Education for England and Wales in its scheme of modern studies in the higher parts of secondary schools and the corresponding examination for the higher school certificates. The regulations giving effect to the scheme as a definite plan for the curricula in secondary schools were issued in 1917, and some progress had been made by the end of that year.

How far opinion has moved since the middle of last century is strikingly exemplified in a quotation unearthed by the Committee from a solemn admonition addressed by Mr. Gladstone to the Public School Commission appointed by his Government in 1861. He warned the Commissioners against the "organic rashness" of putting forth a sacrilegious hand to touch the ark of the covenant. Speaking of the relation of pure science, natural science, modern languages, modern history, and the rest, to the old classical learning, he emphatically denied their right to a parallel or equal position. He regarded the position of modern studies as ancillary, and therefore "to be limited and restrained without scruple." He did not rest his case upon the doctrine that classical training should be paramount because it improved memory or taste, or gave precision, or developed faculties of speech; all these he regarded as "but partial and fragmentary statements, so many narrow glimpses of a great and comprehensive truth," which was that "the materials of what we call classical training were prepared, and we have a right to say were advisedly and providentially prepared, in order that it might become, not a mere adjunct, but (in mathematical phrase) the complement of Christianity in its application to the culture of the human being, as a being formed both for this world and for the world to come." As the Committee says, it seems to-day wellnigh incredible that the view that Latin and Greek should have such a monopoly was once held with so much passionate earnestness.

The Committee gives so excellent a definition of the term "modern studies" that it may well be quoted. It understands it to signify "all those studies (historical, economic, literary, critical, philological, and other) which are directly approached through modern foreign languages"; and it adds, what we think has often been forgotten by schoolmasters, that "the study of languages is, except for the philologist, always a means and never an end in itself." Though by this definition English is excluded, the Committee has had to consider English as a rival subject of study, and finds it to be entitled to paramount rights and necessary as a preparation for the study of foreign languages. At the same time, the Committee fully recognizes that language teaching in schools should have a disciplinary and educative aim, and should train the mind, the taste, and the character. Language is a means of expressing thought, and the study of a foreign language, it says, reveals the anatomy of thought. "Each language has its own mode of expression, and the contrast of and comparison of different modes of expression lead to a more accurate sense of logical processes and a closer observation of the finer shades of meaning." We venture to think that this is a most important observation, and that it affords an explanation of the fact that persons who have had a thorough classical education often write excellent English. The reason is not that the languages were Latin and Greek, but that the study was thorough. Nowadays many a boy leaves school to enter on a career in medicine or science without knowledge of the structure of any language, even his own, with which he has only a colloquial acquaintance. The resulting evil amounts to very much more than the loss of aesthetic value; it causes a good many medical and scientific papers actually published to be defective in expression and in logical arrangement. The directors of laboratories could tell some queer stories of the state in which the first draft of a paper for publication is sometimes presented to them. But the aesthetic part of the matter is not lightly to be set aside. "The laws of language," the Committee says in an eloquent passage, "are sure and valid, but they are revealed in speech and writing as the laws of nature are revealed in living beings—in a delicate harmony of balanced forces and blended qualities"; so that language has not only a logical and intellectual value, but has also an aesthetic and artistic value.

The Committee is by no means blind to the utilitarian value of even a reading knowledge of a foreign language. No country, it truly says, can afford to rely on its domestic stores of knowledge. The whole civilized world is a co-operative manufactory of knowledge. "In science, technical and pure . . . new researches are constantly leading to new discoveries, new and fruitful ideas are giving new pointers to thought, new applications of old principles are being made, old stores are being rearranged, classified, and made available for new purposes. In this work all the civilized countries of the world collaborate; and in no branch of knowledge, abstract or concrete, disinterested or applied to the uses of man, can the specialist neglect the work of foreign students." In the paragraph from which we have quoted the Committee makes an appeal to the universities to put the study of foreign languages in its rightful place. At present, the Committee says, "one way and another it is certain that modern studies do not at the universities get anything like their fair proportion of the best brains." This is due partly to the defects in the methods of secondary schools, but in large part also to the fact that at the universities few distinctions and prizes are to be won in modern studies during or

at the end of the academic course. Fellowships at Cambridge, and still more at Oxford, are rarely given for modern subjects; and, again, in the highest public competition of the kingdom, that for Class I of the Home Civil Service and the Indian Civil Service, modern studies have hitherto had an entirely subordinate position. The Science Committee held that the state should provide funds for scholarships for boys in the higher classes of secondary schools to encourage them to devote themselves to science. With this the Language Committee agrees, apparently in despair of the universities making use of any of their existing endowments for this purpose, but applies it to modern studies generally. Entrance scholarships would not be sufficient; assistance must be given throughout the course, and there must be prizes at the end equal in value and importance to those offered for classical subjects.

INTRAVENOUS INJECTION IN WOUND SHOCK.

BY a curious but happy accident two works on transfusion come almost simultaneously before us. Bernheim's book on blood transfusion, reviewed on page 565, gives an up-to-date account of the practice, while Professor W. M. Bayliss's Oliver-Sharpey lectures are concerned with the contemporary researches carried out by the Special Investigation Committee of the Medical Research Committee, in which he took such an important part. By this coincidence a survey of the subject from the standpoints of practical surgery and of applied physiology is presented. Captain Bernheim, M.O.R.C., U.S.A., author also of *The Surgery of the Vascular System*, summarizes the experience of the past, while the lectures of the distinguished professor of physiology in the University of London point the way to future advances, and are particularly appropriate both as showing the application of physiology to the relief of the emergencies of war and in dealing with arterial blood pressure, a subject to which the late Dr. George Oliver, the founder of these lectures, rendered yeoman service.

Professor Bayliss prefers the term wound shock, introduced by Captain E. M. Cowell, R.A.M.C.(S.R.), in a recent report to the Medical Research Committee, to traumatic or surgical shock, and, after mentioning the primary shock which serves a useful purpose in diminishing the liability to haemorrhage, devotes his attention to the secondary stage of shock. The immediate cause of the low blood pressure is still obscure, but several conditions can be excluded—namely, Yandell Henderson's acapnia; Crile's adrenal exhaustion, because adrenalin is present in excess at the onset of shock; exhaustion of the nerve centres, inasmuch as the reflexes are not diminished to any important degree except when the blood pressure has been low so long that the centres are paralysed from oxygen want; cardiac failure; and paralysis of the arterioles or veins, especially of the abdomen, because direct observation during laparotomies fails to show any abnormal vascular distension. The explanation most in favour is an accumulation and stasis of blood in the capillaries so that it is as effectively removed from currency as it would be by bleeding—Cannon's exaemia. With this deficiency of the circulating blood the blood pressure naturally is low, and as a result the tissues suffer from oxygen starvation, the vasomotor and respiratory centres begin to fail, and being directly dependent on the blood pressure, the excretion of urine and of acid and toxic products falls. After some discussion Professor Bayliss decides that acidosis, which some observers have regarded as the essential cause of shock, is not a serious factor. This point is important as regards the treatment, for transfusion with sodium bicarbonate has been advocated; but in experimental shock the beneficial results of this remedy have been transient and slight, and this effect may quite well have been due to the volume of fluid introduced. The best means of counteracting the production of acid in the tissues is to increase their supply of oxygen from the blood, and if for other reasons it is necessary to give alkalis the oral route should be adopted.

The light thrown on the treatment of shock is the important feature in these lectures. The true objects in the successful combating of shock—namely, an increased supply of blood and oxygen to the tissues—can be obtained by raising the blood pressure, but vaso-constrictor drugs cut off the access of blood to the tissues, and are therefore inadvisable. The proper course is to raise the volume of circulating blood and thereby increase the blood pressure without diminishing the peripheral flow, and for this purpose it has naturally been assumed that transfusion of blood would be the best means. It is therefore surprising to find that experimentally blood is not so superior to a solution of gum arabic as might be anticipated; thus, if a given case fails to respond to gum solution, transfusion of blood is also ineffective. One explanation appears to be that in ordinary conditions there is a sufficient reserve of haemoglobin to keep the tissues provided with oxygen, even with a diluted blood, provided the blood pressure is not too low and the patient is kept at rest.

The nature and composition of the substitute for blood are important factors; Ringer's solution leaves the vessels in half an hour or so, and as the blood pressure then falls to its former level or even lower it is useless; hypertonic solutions of salt also prove valueless, and the addition of calcium salts to Ringer's solution has not improved matters. A colloid with an osmotic pressure is required, and this is provided by a 6 per cent. solution of gum arabic with 0.9 per cent. of common salt: it does not leave the blood vessels or produce any bad effects, such as haemolysis, agglutination, thrombosis, or anaphylaxis; it maintains the blood pressure indefinitely, and has the great advantage of easy preparation. That physiology applied practically has thus scored a triumph is shown by the report on 250 cases of shock by Captains Hamilton Drummond and E. S. Taylor. In conclusion, Professor Bayliss points out that after very grave haemorrhage transfusion of blood would be preferable; and probably this would also apply in cases in which from repeated small bleedings the reserve of haemoglobin has been brought to a low ebb.

WORK OF THE ARMY MEDICAL ADVISORY BOARD.

THE reconstituted Army Medical Advisory Board, appointed about a month ago, has since met frequently for prolonged sittings, and has had a number of important matters under consideration. Among the subjects on which it has been able to formulate its opinion is that of the arrangements which should be made to enable A.M.D. 1—the department concerned with personnel and the allocation of officers to appointments for which they are best qualified by experience and inclination—to work more surely and rapidly. One piece of machinery which was already in existence, and had proved its usefulness, but is now being extended and completed, is a card index of all officers R.A.M.C., whether regular, retired

pay, Special Reserve, Territorial, or holding temporary commissions. The card index is founded upon a form which medical officers have recently been asked to fill up. In addition to particulars as to name and age, medical school, and qualifications, the officer is asked to state any hospital appointments he may have held, and also any other appointments such as that of medical officer of health, and to give information as to any special training he may have had, research work he may have conducted, or publications he may have made. He is also asked to set out how he has been employed during the war, showing the units to which he may have been attached, the expeditionary force or home command in which he has served, and the nature of the duties performed. These particulars are transferred to an index card. The cards are arranged under names in alphabetical order, the index thus formed being retained in the Director-General's office in London. When an officer is posted to an expeditionary force or command a duplicate is forwarded to the head quarters of the force, where it may be added to, or form the basis of, what may be called a local card index. There is one fairly obvious lacuna in the plan, for an officer suddenly transferred, perhaps in an emergency, from one command to another—say, from a base hospital to some post in an advanced area—will arrive in his new command before the information filed at Adastral House or the head quarters of the command to which he formerly belonged reaches that to which he has now been transferred. We understand, however, that a kind of personal diary or identity book has been prepared and will shortly be issued to every officer in the army, and that in the case of officers R.A.M.C. information as to special experience corresponding to that in the card index will be inserted in it. In addition to the primary card index arranged in alphabetical order of names a second card index will be formed in London in the following way: the forms filled up by an officer will contain, as has been stated, information as to any special work he may have done, whether in one of the clinical specialities, or in bacteriology, or hygiene. The forms, after being used for the purposes of the card index, will be passed on, after a primary classification according to the special experience and attainments stated therein, to a series of specialist committees appointed by the Director-General to advise him on the matter. It will be the duty of the committee to grade the officers having this special knowledge, in accordance with the extent and nature of their experience. Taking bacteriology as an instance, an officer who has been holding an independent position and has shown himself capable of undertaking and directing independent researches will be put in Grade 1; from Grade 1 a selection will be made for higher appointments, such as that of director of a military laboratory. An officer with less experience who has shown himself capable of carrying out investigations and researches under the general supervision of the director of a laboratory will be placed in Grade 2, and will be eligible for employment in a similar capacity in military laboratories. Officers who have gone through a course of training in, say, bacteriology, but have not yet won their spurs in research, will be placed in Grade 3, and will be employed as opportunity may arise as assistants in military laboratories and will be given facilities for undertaking investigations under supervision. The same principle will apply to other specialities. Other matters which have been engaging the earnest attention of the Army Medical Advisory Board are the organization of officers' hospitals in adequate numbers and suitable localities and under efficient supervision; and the establishment of hospitals for dealing with cases of disordered action of the heart or valvular disease, so that men who can be rendered fit may be sent into the combatant ranks or returned to them, or discharged if not likely to become fit. This will probably involve the allotment of beds in selected hospitals and the establishment of convalescent institutions for each command. A matter which is being taken up immediately by the Board is the treatment and general disposal of gassed cases. The work already done by the Army Medical Advisory Board has justified its reappointment, and it will, we have no doubt, be able in the future to render very valuable assistance to the Director-General and his staff.

MEDICAL NEEDS OF THE U.S. ARMY.

THE Surgeon-General of the United States Army, on April 3rd, made a formal request to the American Medical Association to co-operate, through its central and local machinery, in the work of securing additions to the Medical Reserve Corps, and of keeping the numerical strength of the corps up to the requirements of the service whilst safeguarding the interests of the civil community. On that date the personnel of the Medical Department of the army included 838 officers of the regular Medical Corps, 18,279 officers of the Medical Reserve Corps; together with some 1,300 officers of the Medical Corps of the National Guard and National Army; a Dental and a Dental Reserve Corps, numbering about 5,400; and a Sanitary Corps and Ambulance Service with some 1,200 officers. All officers of the Medical Reserve Corps who have received their commissions and are ready for active service will be required for present needs, while the additions to the United States army during the next few months will necessitate the service of 5,000 medical men who have not yet applied for commissions. It is estimated that the Medical Reserve Corps will need a steady increase of 2,500 applicants a year during the continuance of the war, to replace wastage and provide medical personnel for organizations not yet authorized. The surgeon-general is at present authorized to maintain a strength of 3,600 medical officers in instructional training camps. The War Department desires that the interests of the civil population should be conserved as far as possible and that no enlistments should be made in the Medical Reserve Corps that would "work serious hardship upon any community, manufacturing concern, or other civil activity." In asking the American Medical Association to assist in this double task, Surgeon-General Gorgas records his appreciation of the valuable help which it has already rendered to the War Department. The association has prepared a survey of the response already made by the medical profession of the United States to the call for volunteers for military service. It is interesting in this connexion to note the present position in Germany. According to a recent statement made in the Reichstag, more than two-thirds of the German medical profession are now serving in the army, with the natural result that many civilian districts in Germany are suffering from a serious shortage of doctors.

THE CAUSATION OF INDUSTRIAL ACCIDENTS.

A VALUABLE report[1] by Dr. H. M. Vernon to the Health of Munition Workers Committee on the factors concerned in the causation of industrial accidents is based upon his analysis of some 50,000 accidents which occurred at four large munition factories. At one factory the data were tabulated for 25½ consecutive months, at the other three factories the data were tabulated for 9½ to 13 months. At each munition works both men and women were employed. The special feature of this investigation, wherein it differs from previous inquiries, is that the accident data are correlated with the corresponding output data. Of the factors concerned in accident causation Dr. Vernon regards speed of production as by far the most important. The main personal factors are fatigue, psychological influences, nutrition, and alcohol consumption. Factors depending upon external conditions not directly under the worker's control include

[1] Health of Munition Workers Committee, Memorandum No. 21. H.M. Stationery Office. Price 6d. net.

lighting, temperature, humidity and ventilation, defects of machinery, and absence of guards. Comparison of the hourly variations of accidents and output shows that during the day shift the accident curve corresponds qualitatively with the output curve; but the night-shift accidents attain their maximum at the beginning of the shift, and dwindle more or less steadily the whole night through, although the night-shift output curves for all but the last quarter closely resemble the day-shift output curves. The causes of this discrepancy between the accident and output curves of the night shift are mainly psychological. It appears that both men and women are much more prone to attend at the dressing station in the first part of the night shift than in the last part, but beyond this there is the more important factor of mental equilibrium. The day workers come to the factory in a sleepy state, but brighten up as the day goes on and the prospect of rest and enjoyment grows nearer. The night workers, on the other hand, have had their fun before coming to work, and so they start work in an excited state, which tends to produce carelessness and lack of attention, but calm down as the night wears on, since they have nothing but breakfast and bed to look forward to. The increase of accidents observed during the course of the morning spell is due partly to increasing speed of production, partly to increasing inattention arising from thoughts of pleasure to come, and partly, in women, to fatigue. Dr. Vernon explains how in lathe work a speeding up of 10 per cent. may well induce an increase of 50 or 100 per cent. in the number of accidents; a given speeding up of output means a relatively much greater speeding up of the movements made at moments when the workers are specially liable to knock their hands against cutting tools. The women were very much more fatigued by long hours than the men, and this fatigue predisposed to accident; in one factory a twelve-hour day increased the accidents among women two and a half fold, whilst it had little or no effect on the men. Dr. Vernon believes that if the factors of speed of production, alcohol consumption, illumination, and temperature could be equalised in the day and night shifts, the night accidents would be even fewer than those recorded—probably not more than two-thirds to three-quarters as numerous as the day accidents; and he is satisfied that this great difference is due to the psychological factor, the mind of the day worker being much more occupied with thoughts of matters unconnected with the work in hand. Cold tends to numb the fingers and blunt manual dexterity, and so increases the frequency of accidents. In one factory the women suffered nearly two and a half times as many accidents on the coldest days as on the warmest; the men were slightly less susceptible, but even they had more than twice as many accidents. At another factory which was better warmed there was no detectable seasonal change in the number of accidents. In order to reduce accidents to a minimum the temperature should be kept between 65° and 69° F.; as the thermometer falls below 50° accidents increase very rapidly. The problem of the causation of industrial accidents is extremely complicated, and Dr. Vernon points out that it can never be solved completely, since it is impossible to obtain data controlled by only one of the numerous factors; all are exerting their influence in greater or less degree, and it is only by a differential method that useful conclusions can be reached. Many industrial accidents—probably most—are unavoidable, and at best one can only hope to reduce their number. Moreover, any improvement of factory conditions which increases speed of production tends to an even greater increase of accidents. But if in all workers throughout their hours of labour the same mental outlook could be induced as is present in the night-shift workers during the early morning hours, the proportion of accidents due to carelessness and inattention would be greatly reduced. As a step in this direction Dr. Vernon recommends that all conversation should be stopped, except that relating to the work in hand. Plugging the ears, if the workers would consent to do it, would shut out the distracting din of machinery, and, where practicable, lathes or other machines might well be separated by partitions. Excessive fatigue can be avoided by choosing suitable hours of labour.

AUTO-AGGLUTINATION OF RED BLOOD CORPUSCLES.

A DETAILED investigation of a case in which the blood serum contained an auto-agglutinin for the red blood corpuscles has been made by Clough and Richter[1] at the Johns Hopkins Hospital. Agglutination of a human being's red blood corpuscles by his own serum is so rare that some authors deny its occurrence. It has been described in hypertrophic cirrhosis of the liver by A. Klein and Reitmann, and by Landsteiner in horses and other animals. The auto-agglutination was probably independent of the disease (bronchopneumonia and auricular fibrillation) for which the patient came under observation, as it was present in a slighter degree in her daughter, and therefore may be regarded as a hereditary phenomenon. As the red blood cells when washed free from serum did not tend to agglutinate, the serum was solely responsible for the process, which occurred only at temperatures below 22° C.; the agglutination broke up at the body temperature. This auto-agglutinin was quite distinct from the ordinary iso-agglutinins, which act at the normal body temperature, since either could be adsorbed from the blood serum, leaving the other intact. An attempt to determine the chemical nature of the auto-agglutinin was inconclusive; by liberating the agglutinin from the washed red agglutinated red cell stroma a solution of agglutinin was obtained which gave a negative result with Heller's test and no precipitate with ammonium sulphate, thus showing that the solution contained less protein than in a 1 in 2,000 dilution of horse serum. The blood serum of the patient did not show any auto-haemolysin. Ascoli, who reported several cases of auto-agglutination, appears to have confused this phenomenon with rouleaux formation, and, in order to distinguish the two conditions more clearly, Clough and Richter made a similar study, not yet complete, of rouleaux formation. They found that the substance causing rouleaux formation resembled the auto-agglutinin in that it also was active on cells from other individuals, was precipitated from the serum with euglobulin, and was not dialyzable; but differed in being active in concentrated serum only, in the rapid disappearance of its activity on standing, in causing rouleaux formation both at high and at low temperatures—its activity being increased by heating the serum to 65° C., and in not being adsorbed from the cells in the process of rouleaux formation.

CUTANEOUS AND FAUCIAL MANIFESTATIONS IN ACUTE POLIOMYELITIS.

As the onset and systemic stage of acute poliomyelitis may suggest the diagnosis of one of the exanthemata, such as scarlet fever or measles, attention should be paid to Dr. J. C. Regan's report[2] on the tongue, mouth, throat, and skin manifestations, about which comparatively little has appeared in the recent literature on the disease. His conclusions are based on observation of over 800 cases during the acute stage. The pharyngeal and faucial mucous membrane is almost constantly congested in the early stages, the soft palate being diffusely dark red in colour, while the hard palate is unchanged. Anaemia of the throat in the acute stage is very rare, and is almost confined to bulbar cases with a hopeless prognosis. The punctiform rash common on the soft palate in scarlet fever is not present in acute poliomyelitis, and the throat of

[1] *Bull. Johns Hopkins Hosp.*, Baltimore, 1918, xxix, 86-93.

[2] Reprint Series, No. 69. Department of Health of the City of New York, February, 1918, pp. 17. Reprinted from *Arch. Pediatrics*, December, 1917.

measles and of diphtheria after the membrane has disappeared is much more like that of poliomyelitis than is the throat of scarlet fever. Mild inflammation with some enlargement of the tonsils is very common, but follicular exudation and true membrane do not occur. In five cases the oral mucous membrane showed appearances like Koplik's spots. In bulbar cases there may be conjunctivitis. In the early stages the tongue almost always shows a moist greyish or yellowish-white coating, the tip and edges being free and redder than normal; after removal of the fur the papillae are not prominent as in scarlet fever. The coating is often "geographical" in its distribution. The lingual appearances in acute poliomyelitis and cerebrospinal fever are much alike as regards the thick yellowish-white covering over the anterior and middle parts of the dorsum. Gingivitis occurs in 10 per cent. of the cases, and is not so common or so well marked as in measles. Rashes are so frequent that they should be regarded as among the possible signs rather than as accidents, and among 1,017 cases were noted in 114, or 10 per cent. The same patient may have two rashes, one during the first or second week and the other during convalescence; 80 per cent. of the rashes occur in children under 3 years of age, and over 80 per cent. were observed during the first week. The mortality appeared to be lower in the cases with rashes than in those without. The average duration of the rashes, which may appear as early as the second day or as late as the sixth week, is about four days. In 90 per cent. the neck and chest were the site of the rash, and the extremities, especially the lower, were the parts least often affected; this distribution is obviously of value in the diagnosis of a scarlatiniform eruption from true scarlet fever. Bulbar cases rarely had an eruption, whereas meningitic cases very frequently presented this sign. The commonest rash is a pin-head papular eruption, which is generally preceded by a scarlatiniform eruption lasting from twelve to twenty-four hours. When occurring during convalescence a scarlatiniform rash, especially if the throat remains congested, is often difficult to diagnose from true scarlet fever, but the other symptoms are negative, and desquamation does not occur on the palms and soles. Many of these rashes are ascribed to intestinal toxæmia or to sweating, and the pin-head papular rash closely resembles, if it is not identical with, miliaria papulosa. Though herpes does not occur, large blebs may form on the skin. Desquamation, though rarely described in connexion with poliomyelitis, may be very frequent and profuse, usually furfuraceous and resembling that of measles, but sometimes suggesting scarlet fever; its distribution corresponds to that of the rash.

SERUM DISEASE.

THERE is a striking difference between the way in which animals and human beings react to a first injection of a foreign protein; in experimental animals the primary sensitizing injection is not followed by the train of symptoms so frequently seen in the serum disease of man. Anaphylaxis in man has naturally not been investigated to the same extent as in animals, and hence a recent research by Longcope and Rackemann[1] into the relation of the circulating antibodies to serum disease in twenty-five individuals who had received various quantities of antitoxic or antibactericidal horse serum is of interest. In order to determine the time of appearance and relation to serum disease of the circulating antibodies to horse serum observations were made at short intervals before, during, and after serum disease in the twenty-five cases by three methods—the precipitin test for horse serum, the demonstration of anaphylactin by the passive transmission of anaphylaxis to guinea-pigs by the injection of the patient's serum, and the production of a specific skin reaction by the intradermal injection of a minute dose of horse serum. The conclusions from these observations are to the effect that serum disease is due to a reaction taking place in the cells of the body, and probably depends on the formation of a poison in the cells; that antibodies appear in the blood at first slowly and later rapidly after the occurrence of serum disease, their extrusion into the circulation being probably the result and not the cause of the serum disease; and that their presence in the blood serves to neutralize or destroy the antigen, and is a purely protective mechanism determining recovery from these manifestations. During the incubation period of serum disease there are no antibodies in the blood which contains a constant amount of the antigen (horse serum); but antibodies are forming in the cells, and when an explosive union between them and the antigen in the blood serum occurs the manifestations of serum disease appear, and their course depends on the amounts of antibody and antigen; thus, if the amount of horse serum originally injected is large and the antibodies slowly formed and deficient in amount, the antigen will persist and the manifestations of serum disease will be severe, prolonged, and relapsing. Whereas when the amount of horse serum originally injected is small and the antibodies formed in large amount it is probable that the antigen in the circulation will be soon removed and the serum disease mild and short. This reasoning corresponds with the general clinical experience that the severity of the serum rashes and other manifestations is in relation to the amount of serum injected. As regards the specific skin reaction it was shown that sooner or later this always follows injections of horse serum, whether in small or large doses, and that, unlike the presence of precipitin and anaphylactin in the blood, it is not dependent on the occurrence of serum disease.

[1] W. T. Longcope and F. M. Rackemann, *Journ. Exper. Med.*, Baltimore, 1918, xxvii, 341-358.

THE LISTER INSTITUTE.

THE twenty-fourth annual report of the governing body of the Lister Institute shows that, as in previous years, energies have been almost entirely devoted to investigations bearing on problems arising out of the war and to routine war work. As we announced some time ago, experiments made by the Trench Fever Committee have shown that the accusation against the body louse that it is the agent guilty of transmission was well founded; the infection would appear to be derived not from the bite but from the excreta or crushed body of the louse, which becomes capable of conveying infection only about twelve days after being itself infected. Trench fever is, from the man power point of view, an important disease, and the discovery that the louse is one, if not the main, means of its spread, may lead to its eradication. This lends additional importance to the inquiries now being made on the best method of ridding soldiers of lice in the field, which are being carried on by Mr. Bacot in the Entomological Department of the Institute. The committee consists of Major-General Sir David Bruce (chairman), Dr. J. A. Arkwright, Mr. A. W. Bacot, Major W. Byam, R.A.M.C., Sir Walter Fletcher, K.B.E., F.R.S., Lieut.-Colonel H. French, M.D., R.A.M.C., and Lieut.-Colonel D. Harvey, C.M.G., R.A.M.C. The expenses of the inquiry have been borne by the Lister Institute. In its Bacteriological Department investigations have been continued into the prophylactic uses of dysentery vaccines and the serological classification of organisms of the suipestifer group. In the Biochemical Department an investigation has been carried out for the Food Production Committee on the use of yeast foods in baking. Experiments on scurvy and beri-beri have been continued in this department, and in the director's department, under the direction of Miss Chick. The War Office committee on the study of tetanus, under the chairmanship of Sir David Bruce, has continued its work and Professor Sherrington, at Oxford, has made further investigations on the action of antitetanic serum in arresting tetanus in experimental monkeys. One result of Captain Tulloch's

work at the Institute has been to show that at least three groups of organisms, differing from each other in their serological reactions, are included in the general designation *B. tetani*. The bearing of these observations upon the prophylaxis and therapeutics of the disease is at present a matter of inquiry, and the same worker has recently made observations on the part played by concomitant infection with anaërobic organisms other than *B. tetani* in the causation of tetanus, which it is hoped shortly to publish. Miss Robertson, as a result of the examination of 272 septic wounds, has shown the presence in many of a non-pathogenic organism morphologically indistinguishable from *B. tetani*, but differing in cultural and serological reactions. The routine work of the institution has been chiefly concerned with the preparation of vaccines and serums. The quantity produced at Elstree under the direction of Dr. MacConkey, assisted by Miss Homer, was prodigious, and included over 86,000 doses of tetanus antitoxin, nearly 58,000 doses of antidysentery serum, and over 150,000 of bacterial vaccines. At the request of the War Office, antimeningococcus serum has been put up in separate phials containing serums prepared from Types I, II, III, and IV of the meningococcus, and a large quantity of the various types have been supplied, as also of the four types mixed, for use where diagnosis is not clear. During the year the biochemical staff and the applied physiology staff of the Medical Research Committee have occupied several laboratories in the Institute, and accommodation has also been placed at the disposal of the Canadian and Australian Army Medical Corps, and of the cerebro-spinal meningitis laboratory of the War Office. As in the previous year, many members of the staff have been engaged in special war work either at the front or in military hospitals at home, but the large volume of work accomplished shows the zeal of the workers who remain and the excellence of the general arrangements carried out by Professor A. Harden, who is acting as director in the absence of Lieut.-Colonel C. J. Martin, and the stimulus of the influence of Major-General Sir David Bruce, who has acted as chairman in the absence of Major-General Sir John Rose Bradford.

MORBIDITY IN ART.

DR. T. B. HYSLOP'S oration before the Medical Society of London, on May 13th, dealt with some of the medico-psychological aspects of modern art, medicine, literature, and science. In the absence of the orator through illness, the president, Sir StClair Thomson, spoke the lines with becoming point and humour. In explanation of the vogue of morbidity in pictorial art as displayed by certain modern schools of painting, Dr. Hyslop quoted the opinion of Heine, that however mad a man may be he will always find somebody madder to admire him. From his study of the artistic efforts of the mentally unsound at Bethlem and elsewhere he concluded that art in asylums is just as honest and may be as pleasing as that exhibited for public gain. But he appeared to draw a necessary distinction between insane art and works of art which are not insane though produced by insane artists. We must not forget that while there are medico-legal tests for determining whether an individual—artist or artisan—is or is not of unsound mind, there are no fixed standards wherewith to estimate the sanity or otherwise of a work of art. The two things are in quite different planes. The physician is a good judge of sanity in an artist, but he is out of his depth when he presumes to appraise the sanity of a nocturne by Whistler, a statue by Rodin, or even of a neocubistic sunset. It is said that many great painters, sculptors, and engravers have suffered from nervous or mental disorders, or have shown distinct signs of degeneracy, though little trace can be found of this in their work. Great musicians, too, in common with other geniuses, seem to have been prone to madness, but here also it is well to bear in mind the difference between degeneracy in the artist and degeneration in art: one is a question of fact, the other a question of taste. Dr. Hyslop's discourse bore witness throughout to his many-sided tastes and accomplishments, and was followed with keen interest by a large audience.

MIDWIVES BOARD FOR IRELAND.

IN view of the fact that the profession in Ireland will shortly be asked to elect four representatives on the Central Midwives Board for Ireland, which is about to be formed, the Irish Midwives Act Committee held a meeting on May 14th at the Royal College of Surgeons, Dublin, and decided to put before the profession the names of the following four gentlemen as candidates for election: Sir Andrew Horne (chairman of the Committee), Dublin; Sir William Smyly, Dublin; Sir John Byers, Belfast; Professor Corby, Cork. The recommendation of this committee will undoubtedly have great weight with the electors when they are called upon to exercise their choice.

As will be seen from a detailed note in the course of a report of the last meeting of the Council of the Royal College of Surgeons of England, published elsewhere, it is proposed to place on a separate list the names of all Members admitted before the year 1870 whose addresses cannot be ascertained. This separate list will not be published in the *Calendar* for next year, 1918–19. At present the number on this separate list is a little over 1,000. Any Member who thinks he may fall within this category—that is to say, who obtained the diploma before 1870 and has not recently communicated his address—and wishes his name to be retained in the *Calendar*, should at once communicate with the Secretary of the College.

Medical Notes in Parliament.

Seniority Roster for Territorial Medical Officers.—Mr. Macpherson informed Sir Francis Blake, on May 15th, that a general seniority list of officers of the Royal Army Medical Corps (Territorial Force) is now in existence, but its publication was dependent upon certain alterations in establishment which had not yet been finally approved. Promotion would be by selection from among senior officers who had been recommended by general officers commanding in chief and approved by the Army Council. There were, of course, separate lists for the several ranks. Sir F. Blake asked if Mr. Macpherson was aware that some of the officers had twenty to thirty years to their credit, and that some of them had been upwards of ten years in their present rank. Mr. Macpherson said he was aware of that, and he hoped that the answer he had given would remedy these hard cases.

Medical Students in the Royal Navy.—Mr. Watt inquired, on May 9th, as to the arrangements being made by the Admiralty for the return of medical students from active service to continue their studies, and whether communications had been received from the Scottish universities pointing out the urgency of speedy relief in view of the fact that the summer medical session began on April 24th. Mr. Pretyman replied that an order was issued in January last calling for report of the names of all officers and men (other than surgeon probationers) who had, as medical students, passed the first professional examination in chemistry, physics, and biology. On receipt of these reports the lists were scrutinized, and where such a course appeared desirable the officer or man was allowed to return to continue his studies. Certain probationers were allowed to be demobilized at the end of six months' service at home or twelve months abroad in order to complete their studies and qualify. Mr. Pretyman could not trace any communication from the Scottish university authorities with regard to speedy release. A number of officers and men had already been conditionally released, but some time must elapse before the replies from distant stations were received and dealt with.

Treatment of Shell Shock Cases.—Mr. Hodge announced, on May 13th, in reply to Sir Montague Barlow, that he had decided, upon the recommendation of his medical advisers, to discontinue the use of the institution at Golders Green, which was within the zone of anti-aircraft gun fire, as a home for the treatment of shell shock and neurasthenia. Accommodation in a rural district, admirably suited for the treatment of these cases, had been procured at some distance from London. On

another question, by Sir William Collins, Mr. Hodge said that the reports received of the treatment of neurasthenic patients at this institution were satisfactory; but he had decided, on the recommendation of his medical advisers, that patients suffering from these diseases should be removed as far as possible from anti-aircraft gun fire. Fifty per cent. of the cases that were offered accommodation at Golders Green had declined to enter the institution. Many of the reasons alleged were on account of the fear of air raids, and a large number of the beds available were not in use.

Ozone Treatment of "Gassed" Soldiers.—In reply to Sir George Greenwood, who asked a question as to ozone treatment for "gassed" patients, Mr. Macpherson said that he assumed the inquiry had reference to the "Quain" ozone producer. He was informed that a description of this was forwarded to the Chemical Warfare Medical Committee in February last. The committee duly considered the matter, and reported that they were of opinion that it would be highly injurious to employ ozone in the treatment of "gassed" cases. The committee felt justified in forming this opinion without any further investigation.

Inoculation against Typhoid.—Sir A. Black asked, on May 14th, whether soldiers were now inoculated with a vaccine to protect against typhoid fever and paratyphoid A and paratyphoid B; how many doses were administered; and how often it was repeated. Mr. Macpherson replied that two doses of the vaccine were administered, the second being given after an interval of ten days. Soldiers were reinoculated yearly.

Pension Rights of Reinstated Officers.—Sir William Collins asked whether an officer who was reinstated after relinquishing a commission owing to wounds thereby permanently voided any accrued pension rights. Mr. Hodge said the matter was under consideration, and he hoped shortly to announce the decision.

Disablement Benefit.—Mr. Denniss asked, on May 14th, what arrangements had been made for the discontinuance of disablement benefit when a person reached 70 years of age and the full old age pension could be substituted in accordance with the original intention. Sir Edwin Cornwall replied that the administration of old age pensions did not fall within the province of the Insurance Commissioners, but it did not necessarily follow that a person in receipt of disablement benefit under the Insurance Acts was entitled at the age of 70 to a full old age pension. The usual statutory condition applied in each case.

Joint Insurance Committee.—Sir Edwin Cornwall stated, in reply to Mr. Booth on May 14th, that the Insurance Joint Committee meets as frequently as the business to be dealt with by it required. Mrs. Creighton was the only woman appointed. She resigned in November, 1913, and no other woman member had been appointed. The representatives of Scotland, Ireland, and Wales, who were the chairmen of the respective Commissions, were invited to attend all meetings of the committee, and were almost invariably present.

THE RECENT EPIDEMIC OF OBSCURE ORIGIN.

THE following notes on cases of an obscure disease with cerebral symptoms recently prevalent have been prepared by the Medical Department of the Local Government Board (May 15th, 1918).

During the last three months a number of cases have been recorded in the medical press, and have been notified informally to medical officers of health, the symptoms of which have been described as bearing some resemblance to those of botulism. These and other cases are being investigated by medical inspectors of the Local Government Board and medical officers of health in collaboration with medical practitioners, but it seems advisable at this stage of the inquiry to summarize such records as are at present available.

Incidence.

The earliest case is reported to have had its onset on January 26th, and there were two having onset in the week beginning February 10th, and two in the last week of that month. In consecutive weeks in March, 7, 3, 10, and 14 cases came to notice, and in April and the first week of May the corresponding numbers were 11, 19, 14, 16, and 6.

The largest number of cases have been recorded in London, but groups of cases have occurred also in Sheffield and Birmingham, and single cases (and in one town 3 cases) have been notified from many other parts of England and Wales. The cases occurred among persons having the most varied occupations. No group of cases was associated with a single occupation. In only one instance were there two cases in the same household, and in this instance the second case was very mild and not admitted to hospital. The cases reported occurred about equally in the two sexes.

Although it is assumed that all the reported cases are of the same disease, this cannot be regarded as certain. Already there is evidence from the *post-mortem* room that some of the cases are more ordinary disease.

The case mortality among cases regarded as belonging to the outbreak has approached 20 per cent. It is probable that slight cases have been overlooked.

The following table gives the approximate age incidence of 105 cases as compared with that of 2,559 cases of poliomyelitis notified in recent years in England and Wales.

Age.	Poliomyelitis.	Present Outbreak.
Under 10	88.2	14.3
10-20	8.3	24.8
20-30	2.0	15.2
Over 30	1.5	45.7
	100.0	100.0

Three cases occurred in infants in the first year of life, one of them (reported by Drs. Batten and Still in the *Lancet* of May 4th) being in a breast-fed infant aged 3½ months. Five were in children aged 1 to 5, and seven in children aged 5 to 10. Of 105 cases of which partial reports are available, 64 occurred in persons over 20 years of age.

Symptoms and Signs.

The clinical records at present available relate to 87 cases, but many of them are incomplete, and it is not certain that in all cases there was paralysis of cranial nerves. Using the terminology adopted by the different observers, the chief symptoms and signs recorded may be summarized as follows:

Among general symptoms pyrexia was recorded as being present in 41 of the 87 cases, usually in the early stage of the illness. It may have been present in some other cases which were not reported on while in that stage. In 8 cases it was stated that there was no fever. Of other general symptoms headache, or localized occipital, temporal, or frontal pain, was recorded in 31 cases. Profuse sweating was noted in 7 cases, and the presence of erythematous or other rash in 6.

Various mental symptoms come next to pyrexia in order of frequency—namely, drowsiness in 29 cases, lethargy in 18, stupor in 13, asthenia in 12, coma in 9; also vertigo in 17 and delirium in 20. Absence of lethargy was recorded in 3 cases and the presence of restlessness, or irritability, or sleeplessness in 5.

Of symptoms referable to partial or complete paralysis of certain cranial nerves there were recorded bilateral facial paralysis in 9, unilateral in 11; bilateral ptosis in 32 cases, unilateral in 2; ophthalmoplegia in 18, diplopia in 18, strabismus in 10, nystagmus in 9, double third nerve palsy in 6, pupillary dilatation with failure of accommodation in 2, paralysis of the tongue in 2; affections of speech were noted in 5 cases. Rigidity of the muscles was recorded in 10 cases, muscular tremors in 9, and twitching or jerking of certain muscles of the face or limbs in 6.

Among symptoms referable to the gastro-intestinal system obstinate constipation was recorded in 35 cases, vomiting in 10 cases, difficulty of swallowing in 9, and dryness or soreness of the throat in 3. The parotid glands were swollen in 2 cases. Retention of urine was recorded in 15 cases, incontinence in 3. The records relating to the circulatory and respiratory systems are not sufficiently complete for useful summary at present.

Relationship to Food.

Although in a considerable proportion of the reported cases there was a history of the recent consumption of such foods as sausages, sardines, shrimps, lobster, tinned salmon, cheese, bacon, and ham, these and other exceptional foods had not been consumed in the majority of reported cases; and no particular food has been found to be related to the outbreak.

The pathological investigation of the outbreak is being undertaken by the Medical Research Committee. The results so far obtained show no bacteriological evidence of botulism, and give no support to the association of the outbreak with infection from food. Further investigations are in progress.

THE WAR.

MILITARY CONVALESCENT HOSPITALS.

We are indebted to Major George Lane, R.A.M.C., S.R., for the following extracts from an article on the organization and general working of convalescent camp hospitals:

In July, 1916, I was appointed Commandant of the convalescent camp hospitals at ——. I soon arrived at the conclusion that thorough drainage would make the site all that could be desired even in the wettest seasons. The whole system of drainage, road-making, bridging, and levelling of this camp (of over 5,000) was done by the convalescents themselves, under the direction of myself and my officers. The work took nearly twelve months to complete.

Site.

The site of a convalescent camp should be naturally well drained, or admitting, without great labour, of an easy drainage system. It should also be fairly sheltered. For troops recovering from wounds and debilitating illnesses a dry camp is essential. In laying out the camp the possibility of expansion up to six or even ten thousand should be borne in mind.

The position of the camp with regard to railway facilities is very important, as the means of receiving and evacuating the convalescents, and of transport generally, must be considered. There are evident advantages in selecting a site, otherwise suitable, near a great town. There should be ample ground, if possible, for cultivation. In the hospital I commanded I had a vegetable garden for each camp, and planted besides some ten acres of potatoes.

Water, Kitchens, and Stores.

The water supply is of great importance, especially abroad. This must be plentiful and of good quality. There ought to be abundant water for baths, hot and cold, at all times. In addition to the sprays there should be a certain number of fixed immersion baths.

In consultation with the engineer officer and the sanitary adviser proper sites should be chosen for the mess tents (or huts), cookhouses, stores, latrines, etc., for each camp or division, the endeavour being to make each camp a self-contained unit and, as far as means admit, self-supporting. The cookhouses would consist of the usual wooden structures, with cement floors, and fitted with large stoves, supplemented by Soyer's stoves outside.

In consultation with the quartermaster special accommodation should be chosen in a central position for all the stores and equipment of the camp. There should be one quartermaster to each camp or division of 1,000.

Cot Hospital.

The cot hospital should consist of three or four special huts with accommodation for 100 cases. This building requires a small dispensary, kitchen, pantry, pack store, and bathroom, and proper means of heating in winter. The personnel is drawn from the R.A.M.C. Cases of slight relapse or minor illness are quite justifiably treated here, but if the patient's illness is obviously serious or likely to be prolonged, he should be sent to a hospital.

Accommodation on a fairly liberal scale is required for the dental department, which should be near the cot hospital. In my camp there were four dentists, with many mechanics and assistants.

Canteens and Messes.

Dry and wet canteens should be provided in a fairly central position. Convalescent officers, if the camp accommodates them, should, I think, mess separately in their own mess. Sergeants' messes should be arranged for.

Staff.

The staff at head quarters will consist of the commandant, two adjutants, paymaster, camp quartermaster, sanitary officer, and a camp sergeant-major, chief clerk, and other clerks drawn from the convalescents.

Each camp should have a somewhat similar staff on a smaller scale. As these are hospitals, the officer in charge of a camp or division should be a medical man with a bent for administrative work. Dealing with convalescents requires technical knowledge not possessed by, nor to be acquired by, combatant officers. For a thousand men an assistant M.O. is desirable, as classifying men into their proper categories requires great care. The officer in charge of each camp should have detailed for duty under him a combatant officer of some experience. Convalescent officers are usually very glad of interesting light work, which, by the way, is beneficial for them.

In the camps commanded by me all our work was done by convalescents—cooks, nursing orderlies, mess orderlies, and so forth. By this means the men were kept employed and happy, and great economy was effected. As they became fit they were sent off, and their places were filled by succeeding convalescents. But a skeleton permanent staff is essential for the efficient management of a large camp.

Workshops.

My first duty being to get the men fit, I carefully supervised the kitchens and the feeding of the men. Suppers were contrived out of the dinner savings and were greatly appreciated. The food was good and was not spoilt by bad cooks. The men were, by graduated steps, brought to a high state of physical efficiency, and were then passed on. I had a register kept by each medical officer in charge of a camp, wherein was recorded on admission every man's vocation in private life, so that the mistake was not made of putting a carpenter to do a blacksmith's job. Thus the men exercised themselves during convalescence at congenial work of a practical nature and of monetary value. This led me to establish workshops, at first in a small way. Later on, skilled masons and carpenters built, under the supervision of a convalescent engineer officer, a large stone-made workshop containing carpenter's shop, blacksmith's shop, painter's shop, tinsmith's shop, bootmaker and repairer's shop, tent repairer's shop, watchmaker and engraver's shop, tailor's shop, and piano-tuner's room. The materials used by the carpenters and tinsmiths were discarded packing cases and empty paraffin and petrol tins. When completed, the articles were sold at a nominal price. Books were kept showing the materials used and their ultimate disposal. The money received went for the benefit of the funds for the men. Much of the success that attended this venture was due to the help given me by the A.D.O.S., without whose aid I could not have got tools. No men were taught trades.

Each camp had its own barber's saloon, with a tent attached where the men could obtain the services of a skilled chiropodist and masseur. Shortly after my arrival I found difficulty in procuring fresh eggs and chickens, and decided to have my own poultry yard. Later I prevailed on the mess president of the officers' mess to do the same, with good results on strictly business lines.

Recreations.

If the men have plenty of healthy sports and amusements they will regard the camp as their temporary home. The first thing to provide is a good brass band, and if possible a bugle and fife band for route marches. There should be cricket and football clubs, a gymnasium, tennis courts, and, if near the sea coast, boating and swimming clubs. At Christmas in our camp some of the officers and men produced a pantomime, which afforded amusement to thousands of wounded and sick. All the scenery was painted in our workshops, and the costumes, etc., made by our own tailors.

Through the kindness of the British Red Cross Commissioner a motor lorry was available for the use of officers and men proceeding to football matches, etc. The Red Cross had tea and recreation rooms in the camp, and the Commissioner saw that the men were plentifully supplied with games, newspapers, reading and writing materials. The Y.M.C.A. representatives also were very keen in affording the men amusements and in supplying their wants. A cinema show is a great asset to a camp. For the officers I converted an old ordnance hut into a club. It was painted and done up by the men in the shops. I borrowed three full-sized billiard tables, and made the place very comfortable, with seats and card tables.

ARTERIAL CONTRACTILITY IN WOUNDS.

F. KROH and M. KRABBEL[1] have contributed papers on the general pathology of recent gunshot injuries of the circulatory organs. In illustration of the defensive value of the elasticity of the vessel walls a case is mentioned of clean perforation of the femoral artery by a grenade fragment having a diameter two and a half times greater than that of the vessel itself. That severe contusive effects could occur in the absence of any visible macroscopical lesion of the vessel walls was shown by such cases as the following: A bullet wound of the groin was followed by venous haemorrhage and loss of pulsation

[1] *Bruns's Kriegschirurg. Hefte*, 1917, lxv, pp. 61 and 76.

in the femoral artery. The vein was found to be completely severed and the artery spasmodically contracted to the size of a knitting needle. While under observation the artery gradually resumed its normal dimensions, pulsation returned, and the limb became hyperaemic. As an example of thrombosis resulting from the pressure of a haematoma the case is cited of wound of a perforating artery of the thigh followed by extensive extravasation. The great vessels were found to be uninjured, but those portions of the femoral artery and vein which lay within the haematoma were thrombosed. Several examples were mentioned of wounds involving the two outer coats only of the artery, the intima being intact and forming a sacular bulging through the rent. Comment was made on the apparent relative infrequency of injury of the large vessels (apart from those leading to traumatic aneurysm) from bullets and shrapnel as compared with grenade wounds. It was suggested that many cases might escape detection where the wound healed without operation, since the haemorrhage might be insignificant in these cases. In examining a recent bullet wound of the arm in which haemorrhage had been slight, the brachial artery was found to be completely severed, and its wounded extremities were occluded by firm thrombi, which must have formed with extreme rapidity. Other similar cases are mentioned, and Kroh described a case of penetrating shrapnel wound of the right ventricle, where the wound was found to be perfectly occluded by a clot.

CASUALTIES IN THE MEDICAL SERVICES.

ROYAL NAVY.

Prisoner of War.

Surgeon W. A. McKerrow, R.N.

ARMY.

Killed in Action.

MAJOR R. G. GORDON, D.S.O., R.G.A.

Major Reginald Glegg Gordon, D.S.O., R.G.A., killed on March 26th, during the recent retreat, whilst riding at the head of his battery, was born at Valparaiso on September 26th, 1878, the only son of Mr. D. S. R. Gordon. He was educated at the Edinburgh Academy and University, and graduated M.B., Ch.B., in 1903. He was a keen volunteer, footballer, and cricketer, and everything he took up he did thoroughly. After leaving the university he was appointed an assistant medical officer at the Crichton Institution, Dumfries, and later studied insanity in the asylums of Italy, but on the death of his father he gave up the practice of medicine and took to farming. When war broke out he lost no time in joining the colours, and was mentioned in dispatches last year, and received the D.S.O. in January, 1918. His colonel, in a tribute to Major Gordon's qualities as a soldier, writes: "He was a man we all liked and respected. During the trying time of the last few days he carried out his duties in an exemplary manner, with perfect courage, and was a standing example to all others." He leaves a widow and four young daughters.

CAPTAIN P. G. MILNE, R.A.M.C.

Captain Patrick George Milne, R.A.M.C., was reported as killed in action, in the casualty list published on May 10th. He was educated at Aberdeen University, where he graduated M.B. and Ch.B. in 1915, after which he took a temporary commission as lieutenant in the R.A.M.C., and was promoted to captain after a year's service.

CAPTAIN T. WHITELAW, R.A.M C(.T.F.).

Captain Thomas Whitelaw, R.A.M.C.(T.F.), was reported as killed in action, in the casualty list published on May 13th. He was educated at Glasgow University, where he graduated M.B. and Ch.B. in 1912, and took a commission as lieutenant in the 1st Northern (Newcastle) General Hospital on April 20th, 1915. He was attached to the Duke of Wellington's Regiment when killed.

Died of Wounds.

CAPTAIN J. F. MATHESON, M.C., R.A.M.C.

Captain James Frederick Matheson, M.C., R.A.M.C., was reported as having died of wounds, in the casualty list published on May 9th. He held a temporary commission in the R.A.M.C., and received the Military Cross on January 1st, 1918.

CAPTAIN J. B. METCALFE, A.A.M.C.

Major J. B. Metcalfe, Australian Army Medical Corps, was reported as having died of wounds, in the casualty list published on May 10th.

CAPTAIN H. G. MASSY-MILES, R.A.M.C.

Captain H. G. Massy-Miles, R.A.M.C. (temporary), who was stated to have died on service, in the BRITISH MEDICAL JOURNAL (p. 545), was reported to have died of wounds, in the casualty list published on May 11th.

Died on Service.

MAJOR J. W. LITTLE, I.M.S.

Major John Wishart Little, I.M.S., died at Karachi on May 7th, aged 41. He was born on March 27th, 1877, the youngest son of the late Dr. Robert Little of Singapore, and was educated at St. Thomas's Hospital, taking the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1900, and graduating M.B.Lond., with honours in forensic medicine, the same year. Entering the I.M.S. as lieutenant on June 27th, 1901, he became captain on June 27th, 1904, and major on December 27th, 1912. He served on the North-West Frontier of India in the Waziristan campaign of 1901–2 (medal with clasp); and in East Africa, in Somaliland, in 1903–4 (medal with clasp). Before the war he was agency surgeon at Gilgit.

CAPTAIN MCQUIBAN, R.A.M.C.

Captain William McQuiban, R.A.M.C., died on service in Egypt on May 2nd. He was educated at Aberdeen University, where he graduated M.B. and Ch.B. in 1901. He was in practice at Lordship Park, Stoke Newington, till he took a temporary commission in the R.A.M.C.

Wounded.

Co'onel J. W. H. Houghton, D.S.O., A.M.S.
Lieut.-Colonel W. R. Gardner, D.S.O., R.A.M.C.(T.F.).
Lieut.-Colonel J. la F. Lauder, D.S.O., M.C., R.A.M.C. (temporary).
Lieut.-Colonel C. A. Stidston, D.S.O., R.A.M.C.(T.F.).
Major W. McM. Chesney, M.C., R.A.M.C.(S.R.).
Major L. S. C. Roche, M.C., R.A.M.C. (temporary).
Captain D. W. Anderson, R.A.M.C. (temporary).
Captain G. F. Carr, R.A.M.C.(T.F.).
Captain A. Fordyce, R.A.M.C.(T.F.).
Captain S. G. Gibson, M.C., Australian A.M.C.
Captain H. M. Godfrey, R.A.M.C. (temporary).
Captain W. S. Hawthorne, Australian A.M.C.
Captain J. I. Lawson, R.A.M.C.(S.R.).
Captain J. M. Mackay, M.C., R.A.M.C. (temporary).
Captain M. H. Muller, M.C., Australian A.M.C.
Captain R. W. Pearson, R.A.M.C. (temporary).
Captain J. McG. H. Reid, R.A.M.C. (temporary).
Captain A. B. Simes, Canadian A.M.C.
Captain J. M. Smith, R.A.M.C.(T.F.).
Captain J. Stevenson, R.A.M.C.(S.R.).
Captain J. E. G. Thomson, R.A.M.C. (temporary).
Captain T. D. C. Watt, M.C., R.A.M.C. (temporary).
Captain H. E. Williams, R.A.M.C. (temporary).
Captain H. Wilson, R.A.M.C.(T.F.).
Captain and Quartermaster J. T. Starkie, M.C., R.A.M.C.
Lieutenant J. B. Taylor, R.A.M.C. (temporary).

Missing.

Captain S. S. Meighan, M.C., R.A.M.C.(T.F.).
Captain J. F. Nattrass, R.A.M.C.(T.F.).
Captain F. C. Nichols, M.C., R.A.M.C.(T.F.).
Captain S. V. P. Pill, R.A.M.C. (temporary).
Lieutenant D. Robertson, R.A.M.C. (temporary).

Prisoners of War.

Captain D. F. Dobson, R.A.M.C. (temporary).
Captain R. R. Duncan, R.A.M.C. (temporary).
Captain J. G. Elder, R.A.M.C. (temporary).
Captain L. S. H. Glanville, R.A.M.C. (temporary).
Captain D. C. Hanson, M.C., R.A.M.C. (temporary).
Captain H. B. Jones, R.A.M.C. (temporary).

Captain C. E. Redman, R.A.M.C. (temporary).
Captain F. P. Smith, R.A.M.C. (temporary).
Captain J. P. Thierens, R.A.M.C. (temporary).
Captain F. R. Tickle, R.A.M.C. (temporary).
Lieutenant G. B. Berkley, M.C., R.A.M.C. (temporary).
Lieutenant F. J. Power, M.C., R.A.M.C. (temporary).

DEATHS OF SONS OF MEDICAL MEN.

McBride, Andrew Best, Captain Bedfordshire Regiment, elder son of Major John Best McBride, R.A.M.C.(T.F.), of Berkhamsted, died of wounds on April 24th, aged 22. He was born on June 16th, 1895, and educated at Berkhamsted School and at King's College Hospital, London, where he had passed the first professional examination in medicine of London University. He got his commission in the Bedfordshire Regiment as lieutenant on September 28th, 1914, and was promoted to captain on June 1st, 1916.

Rice, Edmund Gabriel, Lieutenant R.A.F., killed in a flying accident at Redcar, Yorks, on May 3rd. He was the only son of Dr. C. E. Rice of Coventry, and was just under 19 years of age. He was educated at Wolverhampton Grammar School and at Bedale School. He became a probationary flight officer in the R.N.A.S. in June, 1917, and was sent to the front in France in December, where he was on active service as an aërial scout until the end of March, when he was invalided home after fainting at a height of 18,000 ft., fortunately recovering at a height of 4,000 ft. in time to avert disaster. He was subsequently appointed instructor. The funeral took place at Coventry on May 8th with full military honours.

Ruxton, William Stewart Mitchell, M.C., Lieutenant Border Regiment, only son of Dr. Ruxton of Newcastle-on-Tyne, killed April 12th, aged 20. He was educated at Shrewsbury, where he was a sergeant in the O.T.C., entered Sandhurst in September, 1915, got his commission in January, 1916, went to the front in July, 1916, was wounded in September, returned to the front in January, 1917, got the Military Cross in September, 1917, and became acting captain in January, 1918.

St. Leger, Wm. Brett, M.C., Lieutenant Coldstream Guards, killed in action April 27th, aged 23, elder son of Major R. A. St. Leger, S.A.M.C., of George, South Africa, and grandson of the late Dr. Brett of Watford, Herts. He was educated at the South African College, Cape Town, and was a corporal in the Cape Town Highlanders when war broke out. He served with that regiment in German South-West Africa, and afterwards came to England and joined the O.T.C., eventually obtaining a commission in the Coldstream Guards. He proceeded to France in July, 1916, and was wounded in July, 1917. He was awarded the M.C. for conspicuous gallantry on that and former occasions.

Stone, Noel Herbert, M.C., Captain Worcestershire Regiment, eldest son of Dr. H. S. Stone of Reigate, killed April 27th, aged 22. He got his first commission on December 16th, 1914.

Tate, Alan C. R., Lieutenant Royal Air Force, eldest son of Colonel Alan Tate, C.M.G., A.M.S., of Quetta, killed while flying on patrol on May 2nd. He was educated at Charterhouse and Stonyhurst, and had served for a year as an orderly under the French Rouge Croix before he entered the Royal Flying Corps as a cadet in June, 1917, passed as a pilot early in 1918, and went to the front in March.

Trevor-Jones, John Eric, M.C., Captain Rifle Brigade, second surviving son of Major E. J. Trevor-Cory, R.A.M.C., killed April 22nd. He was born in 1898, educated at Clare College, Cambridge, and got his commission on January 22nd, 1916. He went to France in July, 1916, and got the Military Cross in March, 1917.

Walker, John Binning, Canadian Reserve, only son of the late John Walker of Kingussie, died of pneumonia in No. 14 Canadian General Hospital, Eastbourne, on May 3rd.

Williams, R. M., Captain Royal Welsh Fusiliers, attached to the Royal Flying Corps, son of Dr. Richard Williams, formerly of Liverpool and now of Llenlog Castle, Anglesey, reported missing on August 12th, 1917, was, according to news received through the German Red Cross, killed on that date.

MEDICAL STUDENT.

Kennedy, Alexander, M.C., Captain Royal Scots, third son of Mr. Alexander Kennedy of Barnton, killed April 26th. He had completed his third year as a medical student when, at the beginning of the war, he enlisted in the Royal Scots. He was wounded while a sergeant, got a commission in 1917, and had rapidly risen to captain.

[We shall be indebted to relatives of those who are killed in action or die in the war for information which will enable us to make these notes as complete and accurate as possible.]

HONOURS.

THE following awards in recognition of "conspicuous gallantry and devotion to duty" in the field are announced in a Supplement to the *London Gazette* of May 13th:

Military Cross.

Temporary Captain Henry Drummond Robb, R.A.M.C.

On his camp and its vicinity being heavily shelled he was compelled to conduct his sick parade along roads which were at the time under heavy shell fire. He succeeded in leading his wounded cases safely under cover, and later remained behind to attend to the men of a neighbouring unit, which had also suffered some casualties as a result of the intense shelling. His courage and devotion to duty were of the highest order.

Temporary Captain Samuel Rutherford, R.A.M.C.

During a period of sixteen hours he tended the wounded in the front trenches without ceasing. Throughout this period he was exposed to heavy shell fire, and for some considerable time the enemy were within a short distance of the aid post. His coolness and presence of mind inspired all ranks with the utmost confidence.

Temporary Quartermaster and Honorary Lieutenant Robert Leslie Masters, R.A.M.C.

When a camp and some billets were heavily shelled by the enemy he at once went to the rescue of some men who had been buried in the ruins of a house, and rendered first aid. He then organized bearer parties from among his men, and brought in four severely wounded men from the camp. By his disregard of danger, quick decision, and good leadership he set a splendid example to his men, and rendered valuable assistance to the wounded in the absence of a medical officer.

In the *London Gazette* of May 11th, 1918, the names of Captain A. J. Evans, R.A.M.C.(T.F.) and temporary Captain A. T. Gibb, R.A.M.C., are added to the list of officers whose services have been brought to notice as deserving of special mention by the late Lieut.-General Sir Stanley Maude, K.C.B., Commander-in-Chief, Mesopotamian Expeditionary Force (BRITISH MEDICAL JOURNAL, August 25th, 1917, p. 268).

NOTES.

THE Inter-Allied Congress on the after-care of discharged sailors and soldiers, which is to be opened at the Central Hall, Westminster, on Whit Monday, May 20th, at 11.30 a.m., by the Duke of Connaught, will meet in four sections. The first—on pensions and allowances—will have Sir Arthur Griffith-Boscawen, M.P., Parliamentary Secretary to the Ministry of Pensions, as chairman, and he will open its proceedings by reading a paper on pensions and allowances. He will be followed by speakers on the same subject from France, Italy, and Belgium, and a general discussion will ensue. The second section—on training—to be presided over by Sir Charles Nicholson, Bt., M.P., will hear papers on the subject from representatives of Great Britain, France, United States of America, Italy, Canada, and South Africa, and after they have been debated a discussion on agricultural re-education will be introduced by a series of papers. The third section—concerned with the treatment of men suffering from nervous injuries or disorders, including blindness and deafness—will be presided over by Lord Charnwood. Papers on neurasthenia will be contributed by representatives of Great Britain, Italy, and Australia. A discussion on the care of the tuberculous soldier will be introduced by Major P. H. S. Hartley, C.V.O., R.A.M.C.; on the blind, by Sir Arthur Pearson, G.B.E.; and on the deaf by Dr. Dundas Grant. The fourth section—on surgical treatment—will discuss the treatment of limbless men, orthopaedics, and functional restoration and re-education of the wounded, the speakers including Sir Wm. Macewen, Sir Robert Jones, Majors Turner and Boyer, C.A.M.C., and Major Sandes, S.A.M.C.

Correspondence.

UNIVERSITY REPRESENTATION IN PARLIAMENT.

SIR,—I am not concerning myself with the political views of either Sir M. Abbot Anderson or Dr. Rowland Fothergill, but when the former states that all the graduates resident in London whose names and addresses could be found were invited to attend a meeting, I at least have my doubts as to the accuracy of that statement, or, to put it in another way, that any great pains were taken to find them.

Certainly at the present moment I am not actually resident in London, as in more peaceful times, but I am on the Council of the Graduates' Association of my university, and joint-secretary of the Metropolitan Counties Branch of the British Medical Association, and one would think, therefore, that both my name and an address could have been obtained fairly easily—even without reference to such a handy aid as the current edition of the *Medical Directory*—but I never received any invitation to the meeting, or even intimation that such was to take place.

I do not know on what date it was held, but it is probable that I was in England at the time, and if so it is certain that I should have endeavoured to be present—if only to hear what was going on.—I am, etc.,

B.E.F., France, May 10th. WILFRED KINGDON.

SIR,—Captain Fothergill, in his letter on the above subject in your last week's issue, stated that "Belfast University is finding a medical candidate without looking to a party in politics for any assistance."

I regret to say that Captain Fothergill's facts are more misleading than fiction. Doubtless Sir W. Whitla's Parliamentary committee were able to find him without the aid of any political party organization, but they are looking to the party politics of the graduates to get him elected as their member. In the official appeal for support the secretaries of his committee begin by saying, "Sir William is a staunch Unionist and a trusted representative of Ulster on the Irish Convention, where during nine months of strenuous labour he has enjoyed the fullest confidence of his colleagues. He is, moreover, a brilliant member of his profession, . . ."—that is, party politics first, medical claims a poor second; unless, indeed, his services at the Convention during its labour, prolonged for a period equal to that of a normal gestation, were of a professional character! (The dismembered condition of the fetus on delivery is notorious, and reflects little credit on the accoucheur!)

The philosophic doubt of Mr. Balfour finds no place in the psychology of present-day Ulster, and should my old teacher be returned as member for the Belfast University, and should the supposed interests of the medical profession ever clash with the supposed interests of the North-East of Ireland, there is no uncertainty as to the lobby into which his political tail will waggle the professional trunk of Sir William Whitla.

Captain Fothergill's idea of non-political representation for our universities is, I fear, Utopian.—I am, etc.,

Old Basford, Notts, May 14th. ADAM FULTON.

THE VALUE OF AMYL NITRITE INHALATIONS IN THE DIAGNOSIS OF MITRAL STENOSIS.

SIR,—The suggestion made by Dr. Morison (p. 452) that the murmur indicative of the presence of mitral stenosis can be made more evident by causing the patient to inhale amyl nitrite is open to more than one fallacy.

The abnormal sound which is very commonly mistaken for the presystolic murmur of mitral stenosis is the diastolic sound, sometimes called part of a reduplicated first sound, sometimes part of a reduplicated second sound audible at the apex, sometimes a mid-diastolic sound, or even the third sound of the heart, and it is probable that this sound, when present, would be made more distinct by the inhalation of amyl nitrite.

It is strange how very few even of well-qualified medical men of considerable experience are aware of the danger of mistaking the sound in question for a true presystolic murmur, in other words, of the danger of considering it to indicate the presence of mitral stenosis.

Although a sound of this character may be heard over a healthy heart in a healthy person, it is more likely to occur in a person with a low vasomotor tone—that is, one in whom the neuro-muscular system of the circulation does not react quickly to the various demands which the movements of the body make upon it. A similar low vasomotor tone is produced by the inhalation of amyl nitrite, and it appears probable that the drug would accentuate a sound which is no indication of disease.

I do not suggest that amyl nitrite may not also render more distinct the true murmur of mitral stenosis. The murmur present in mitral stenosis is, however, one the method of production of which is not evident. Its causation is not, I believe, so simple as Dr. Morison seems to think. The morbid anatomy of mitral stenosis presents other serious changes besides mere narrowing of the mitral orifice. For example, the chordae tendineae may be so shortened that they have disappeared and the large flap of the mitral valve is in contact with the apices of the muscular pillars. The action of the left ventricle must thus be hampered and great muscular strain must be brought to bear upon the thickened and shortened mitral flap. What effect has amyl nitrite upon the hampered ventricle, and how is that effect, whatever it may be, to influence the sound which occurs during the ventricle's contraction? I cannot make any suggestion. The trial of amyl nitrite may prove to be interesting, but it does not seem to me that it is likely to give reliable indications as to whether organic disease is present or not. If it does, I should favour the view that amyl nitrite will influence the diastolic sound of a normal heart but not the presystolic murmur of mitral stenosis.—I am, etc.,

Norwich, April 23rd. THEODORE FISHER.

TONSILLECTOMY IN DIPHTHERIA CARRIERS.

SIR,—It seems to me that Captain Ballantyne and Lieutenant Cornell, C.A.M.C., in their paper on the report on tonsillectomy in diphtheria carriers (BRITISH MEDICAL JOURNAL, 1917, ii, p. 686), start with false premisses. One only of the six cases quoted—namely, the second—ought to be regarded as a carrier. The fifth case might also be admitted by some into this category. Cases 1, 3, and 4 were positive as to swabs for three weeks, nine days, and twelve days respectively before the operation. To classify a patient as a carrier of diphtheria bacilli because he has positive swabs for nine or twelve days is not justified, as it is a common experience in fever hospitals to find this and then to get negative cultures without gargles or throat applications of any kind whatever. Details of the dates of onset of the disease in the various cases cited are lacking, except in Case 6, a man admitted with diphtheria on June 5th; on June 29th (the twenty-fourth day after admission) a tonsillectomy was performed on him, on the ground that he was a diphtheria carrier. This does not seem to me to be sound, and if it is taken as a standard and acted upon, then there will be several hundreds in London alone every year who will have tonsillectomy performed on them as diphtheria carriers, while now, as a result of a little patience, they are discharged from hospital free from any infection.

There is another point to which I would like to draw attention. In these cases the authors were evidently satisfied that the patients were not harbouring the organism after the operation after swabs from the throat only. No mention is made of cultures from the nose. Now, before a diphtheria patient can be said to be free completely from the disease, separate cultures ought to be made from the throat and the nose. It is not uncommon after faucial diphtheria to get persistent negative cultures from the throat, and at the same time to get positive cultures from the nose. I am not confusing purely faucial diphtheria with purely nasal diphtheria when I say this. No mention is made either of a further course of diphtheria antitoxin for carriers. In practice the risk of anaphylaxis in diphtheria is almost negligible.

I was pleased to notice that 12,000 units of antitoxin were given in Case 6, "mild diphtheria," as there still seems to be some diffidence in giving comparatively large doses of antitoxin in diphtheria. In the North-Eastern Hospital it was our practice to give 12,000 to 16,000 units in a mild case, and up to 32,000 or 36,000 (rarely 40,000) units in very severe cases, with a repeated dose in twelve hours if the exudate was still spreading.—I am, etc.,

P. FIGDOR,
March 9th. Captain R.A.M.C.

The Services.

INDIAN MEDICAL SERVICE.

AT a meeting of the Imperial Legislative Council of India on February 28th Mr. Sastri moved a resolution proposing that the technical and scientific services should be recruited entirely in India, and that an effort should be made to provide the requisite educational facilities in that country. After an assurance from the Government spokesman that the Viceroy and Secretary of State were endeavouring to give effect to the progressive realization of responsible government in India the resolution was withdrawn.

At the meeting on March 5th Mr. Sastri brought forward a resolution recommending:

(a) That a civil medical service should be constituted which should be wholly independent of the medical organization of the Indian army, that the higher medical posts which are at present filled by officers of the Indian Medical Service should be transferred to the civil medical service, and that the civil medical service should be recruited from the civil medical officers and the independent medical profession; (b) that the salaries of Indian Medical Service officers employed on civil duty should not be enhanced as recommended by the Public Services Commission; and (c) that military assistant surgeons should not be given preference over civil assistant surgeons, and that not more than one-sixth of the higher posts reserved for subordinate medical officers should be given to them

He protested against the proposal of the Public Services Commission for an advance in the pay of the I.M.S., considering that the number of its members in civil employ shut out native talent and made the civil population dependent on a service which might be called upon to do military duty at any time. He did not share the apprehension that all the services in India would suffer in popularity if British officers and their wives had to resort to Indian doctors. As to the necessity of maintaining a war reserve, he said that he had ascertained from young Indians in the medical colleges that they would be quite willing to support any proposal the Government might make to impose on all officers in civil employ the obligation to undergo military training and to be liable for military service. The private medical profession in India had readily responded to the calls made upon it during the present war. The I.M.S. had done wonders for India, but should not be allowed to dominate the civil population and to keep the children of the soil out of what was rightly theirs.

Surgeon-General Edwards, who has succeeded the late Sir Pardey Lukis as Director-General I.M.S., in his reply, said that acceptance of the resolution would be tantamount to the abolition of the service, which had done work of the greatest value, not only to India, but to the world at large. He spoke of the work done with regard to the malaria parasite, to cholera, amoebic dysentery, prostatic surgery, and eye surgery; with regard to kala-azar and ankylostomiasis, to snake venom, and as to goitre. He then referred to the magnificent educational work done by the I.M.S., and added that if expert professors were to be specially engaged they must be offered much higher salaries and would not have the intimate knowledge of Eastern diseases which officers of the I.M.S. possessed. It must be remembered that very few I.M.S. officers made from £1,000 to £2,000 a year by private practice. Some 400 I.M.S. men held civil posts in India in peace, but a distinguished Indian medical man had informed the Bengal Legislative Council that over 30,000 doctors were required there. At present there were only 2,000 on the medical register, and of these some 40 were I.M.S. men. Could this small band be said to be standing in the way of the aspirations of Bengal practitioners? To cut India adrift from intimate medical contact with progressive Western countries, which would be the outcome of the resolution, would be a short-sighted policy. On the other hand, he was strongly in favour of a Provincial Civil Medical Service; such services existed, but they ought to be greatly enlarged, especially in their public health departments, and the old-fashioned name of "assistant surgeon" dispensed with and the hideous name "subassistant surgeon" forgotten. As the Indian Medical Service was the war reserve, appointments must be reserved for its members in the provincial medical services. That was practically what was now being done. If military medical officers were to be kept fully employed in peace, less than half their number would be amply sufficient to carry on routine military duties. It was asked why this was not done in the R.A.M.C. The answer was that it would be done if the British army in peace were stationed in England and if there existed a civil medical service into which its surplus officers could be drafted. But the British army was scattered all over the world; most of the R.A.M.C. officers would prefer to have more professional work in peace time. The Indian Medical Service had lately ceased to attract medical men of the highest attainments, either British or Indian; it must therefore be mended or ended, and he unhesitatingly maintained that in the interests of India it ought to be mended. If first-class men were required they must be sought in the open market and paid their market value, and he trusted that none but the best would be considered good enough for India. With regard to the third part of the resolution, military assistant surgeons would in future be required to take a qualification recognized in Great Britain. In conclusion, he said that the Government of India had under consideration the complete reorganization of both these services and was not prepared to make any definite pronouncement of policy at the present moment.

Sir William Vincent, speaking on behalf of the Government, paid a high tribute to the work done by the I.M.S., not only for India, but for the peoples of other parts of the world. Mr. Sastri was anxious that a larger number of Indians should enter the service; 40 per cent. of the candidates who passed at the 1914 examination were Indians. Referring to Mr. Sastri's statement as to the willingness of Indian medical men to act as a war reserve, he said that many subassistant surgeons who by the terms of their engagement were liable for military service, had resigned when called upon to fulfil their obligation. Dealing with the proposal to reject the recommendation of the Public Services Commission to improve the pay of the I.M.S., Sir William Vincent said that the difficulties which existed before the war in obtaining recruits would be enhanced after it, and he declared that the Government of India declined to bar itself from maintaining the high qualifications for a medical service which had conferred almost inestimable benefits on the country. At the conclusion of the discussion the resolution was rejected by 38 votes to 15.

The Indian Budget for 1918–19 was presented at a meeting of the council on March 1st; the main features were a surplus of nearly six million pounds sterling and the announcement that there would be no alteration in taxation. There had been an increase in revenue under nearly every principal head, the only marked exception being opium, which showed a decline of £320,000.

Surgeon-General W. R. Edwards, C.B., C.M.G., has been appointed an additional member of the Legislative Council of the Governor-General, and has been awarded a good service pension of £100 per annum, with effect from April 1st, 1915.

Universities and Colleges.

UNIVERSITY OF GLASGOW.

AT a meeting of the General Council last week the Rev. Dr. John Smith, convener of the Business Committee, said that it recommended the council to approve the desire of the university lecturers and assistants for improvement in representation, status, and remuneration, and to ask the University Court to take the request into early and favourable consideration. This proposal was unanimously accepted. Speaking on the minute dealing with the Carnegie Trust, the convener drew attention to the fact that the percentages of leaving certificates gained by new applicants during the last six years were as follows: 74.5, 87.1, 87.6, 91.2, 91.3, and 92.4. The increase, he said, showed the real need for the new university ordinance governing the admission to universities; it would, he hoped, soon receive approval. Finally, he observed that of the 192 names in the obituary list for 1917, 100 were of men who had given their lives in the service of the country.

THE ROYAL COLLEGE OF PHYSICIANS OF LONDON.

AT an extraordinary comitia on May 9th, the President, Dr. Norman Moore, occupying the chair, the following gentlemen, elected to the Fellowship at the last comitia, were admitted:

Walter Broadbent, M.D.Camb., Hugh James Moore Playfair, M.D.Lond., Frederick Lucien Golla, M.D.Oxf., Archibald Montague Henry Gray, M.D.Lond., Alfred Ellington Stansfeld, M.D.Camb., William Whiteman Carlton Topley, M.B.Camb., Charles Hubert Bond, M.D.Edin., Percy William Bassett-Smith, C.B., Sir Walter Morley Fletcher, M.D.Camb., F.R.S., Sir George Newman, K.C.B., M.D.Edin.

It was resolved, on the recommendation of the Censors Board, that the licence to practise physic be restored to Mr. Edmund Lyall Haynes.

The President announced that the "Twilight Sleep" Committee had been constituted as follows: Dr. H. R. Spencer, Dr. G. Blacker, Dr. J. S. Fairbairn, Dr. H. Williamson, and Dr. H. R. Andrews.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary council was held on May 9th, when Major-General Sir George Makins, G.C.M.G., A.M.S., President, was in the chair.

Bradshaw Lecture.—Mr. D'Arcy Power was appointed Bradshaw lecturer for the ensuing year.

Issue of Diplomas.—Diplomas of membership were granted to 102 candidates found qualified at the recent examinations.

Presentation of Bust of John Scott.—This bust, by Chantrey, of John Scott, F.R.C.S., a member of the Council of the College from 1844 to 1846, was presented by Sir L. A. Selby-Bigge, K.C.B.

List of Members.—The Secretary reported that the list of members published in the College *Calendar* contained the names of some 2,224 members who were not registered under the Medical Acts of the United Kingdom, and that, while some could be traced as resident in the colonies and abroad, there were many whose addresses were not, and for some years had not been, known. The names of all members admitted before 1870 whose addresses cannot be ascertained (in number about 1,033), will be placed in a separate list, and such list will be omitted from the *Calendar* for 1918–19.

AT the annual meeting of the Rockefeller Foundation additional gifts for war work to the amount of £37,470 were announced. Of this sum, £25,000 is to be applied to continue the war demonstration hospital of the Rockefeller Institute and £10,000 is allotted to the National Research Council of the Council of National Defence.

Obituary.

MAJOR T. HAROLD HUNT, R.A.M.C.(T.F.), died at Halifax on April 29th, aged 48. He was the son of the Rev. T. H. Hunt of Southport, and was educated at Owens College, Manchester, and the Yorkshire College, Leeds. He graduated M.B.Lond, with honours in 1895, B.S. in 1896, and M.D. in 1898. After serving as house-surgeon to the Leeds General Infirmary and at the Royal Halifax Infirmary he started practice in Halifax. In 1904 he was appointed to the staff of the Royal Halifax Infirmary and medical officer to the Halifax School Board. Later he was appointed medical officer in charge of the Bermerside Open-air School and Convalescent Home. He took a great interest in the School for Defectives at Halifax, one of the first three established in England. In 1915 he was appointed to the staff of the St. Luke's War Hospital, Halifax, with the rank of major, and the strain of this arduous work made great demands on a not very strong constitution. A colleague writes that there can be little doubt that Major Hunt died as the result of his military service. He was at the Royal Infirmay and the military hospital on April 28th but was compelled to return home, and within a few hours an acute attack of pneumonia developed which proved fatal early on April 29th. He was a member of the Halifax Division of the British Medical Association. He was buried with full military honours.

LIEUT.-COLONEL THOMAS WILLIAM O'HARA HAMILTON, C.M.G., R.A.M.C.(ret.), died at Colchester on April 22nd, aged 57. He was the son of Colonel T. Hamilton of Malden, Surrey, and was educated at Trinity College, Dublin, where he graduated B.A. in 1880, and M.B. and B.Ch. in 1881. Entering the army as surgeon on February 3rd, 1883, he became surgeon-major on February 3rd, 1895, and lieutenant-colonel on February 3rd, 1903, retiring on November 4th, 1911. He served throughout the South African war from 1899 to 1902, was present in the advance on Kimberley, including the actions at the Modder River and at Magersfontein, in operations in the Orange River Free State, including the actions of Paardeberg and Wittebergen, and in the operations in Cape Colony, and received the Queen's medal with three clasps, the King's medal with two clasps, and the C.M.G.

DEPUTY SURGEON-GENERAL JAMES HENRY LOCH, Bengal Medical Service (retired), died at Guildford on April 9th, aged 85. He was the son of Rear-Admiral Loch, was born on September 21st, 1832, and educated at Edinburgh University, where he graduated M.D. in 1853. Entering the I.M.S. as assistant surgeon on December 20th, 1854, he became surgeon in 1866, surgeon-major in 1873, brigade surgeon, when that rank was first instituted, on November 27th, 1879, and D.S.G. in 1884. He retired on January 1st, 1889. He served in the Indian Mutiny in 1857-58; in the operations of the Oudh Field Force from January to June, 1858, taking part in the relief of Azimgarh and in the pursuit of Koer Singh, and received the Mutiny medal.

Medical News.

A NUMBER of Italian professors are about to pay a visit to the universities of Great Britain.

LORD LEVERHULME has been elected president of the Royal Institute of Public Health.

A NEW electro-therapeutic and massage department at the Great Northern Central Hospital, Holloway Road, has been completed, and is prepared to deal with 10,000 attendances a year.

THE library of the Royal Society of Medicine will be closed on Saturday, May 18th, and Monday, May 20th, but members of the R.A.M.C. and other medical services will be admitted.

AN American Congress on Infancy will be held at Monte Video under the patronage of the Republic of Uruguay in December, 1918 (19th to 22nd). Representatives of all the countries of America will take part in the proceedings. The president is Dr. L. Morquio.

DR. G. J. MURIEL, who has resided in Whitehaven for fifty years and is consulting surgeon to the Whitehaven and West Cumberland Infirmary, has been appointed to the Commission of the Peace for the county of Cumberland. He was president of the Border Counties Branch of the British Medical Association in 1898-99.

THE first number of a *Review of War Surgery and Medicine* was issued from the office of the Surgeon-General of the United States Army in March, 1918. It is to appear monthly, and to be devoted to abstracts of medical literature relating to the war.

AN appeal, signed by the Rev. W. J. Barton and Mr. Edred M. Corner, M.S., F.R.C.S., honorary secretary of the Old Epsomian Club, is made for funds to rebuild the nave of the chapel of Epsom College in harmony with the chancel, and to place in it a suitable memorial bearing the names of the old boys and masters who have sacrificed their lives in the war.

THE *American Journal of Ophthalmology* has been amalgamated with the *Annals of Ophthalmology*, the *Ophthalmic Record*, *Ophthalmology*, the *Ophthalmic Year Book*, *Ophthalmic Literature*, and the *Anales de Oftalmologia*. The new publication, which will appear monthly, owes its existence largely to the efforts of Dr. Edward Jackson, of Denver, Colorado, who is its editor. The first number appeared in January, 1918.

IN the Probate Court on May 13th leave was given to presume the death of Sir Marc Armand Ruffer, M.D., C.M.G., who, while engaged in Red Cross work, was on board H.M. transport *Arcadian* when she was torpedoed and sunk by a U-boat near the Island of Milos on April 15th, 1917. An obituary notice appeared in the JOURNAL of May 5th, 1917, p. 602.

THE Medical Committee of the Royal Hampshire County Hospital, Winchester, after full consideration, have come to the conclusion that the grant of 5s. 6d. per man per diem offered by the Ministry of Pensions to the hospital for the maintenance of war pensioners will only just cover such maintenance. They feel that the medical treatment of these patients, which is a matter of great national importance, should be paid for by an adequate and direct remuneration of the staff, and that this should be on an entirely separate basis from that of maintenance.

MM. CHABONIER AND BLETON communicated to a recent meeting of the Société de Biologie in Paris certain observations they had made of the frequent occurrence of polyarthritis in the course of the treatment of patients with arsenobenzol (especially 914). The joints remained painful for three or four weeks. A similar condition of polyarthritis was observed to occur in a certain number of non-syphilitic cases treated with arsenobenzol; the condition would therefore seem to be attributable to the drug.

Letters, Notes, and Answers.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2639, Gerrard.
3. MEDICAL SECRETARY, *Mediocra, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Referee to Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

LETTERS, NOTES, ETC.

MEDICAL SICKNESS AND ACCIDENT SOCIETY.

AN OLD MEMBER writes: I have just read in the JOURNAL of May 11th, p. 538, the report of the annual meeting of the above society, and I consider a great injustice was done to old members by the passing of a resolution (at the instigation of the committee) stopping the payment of the usual bonus, after 1918, to those members who attain 65 in the sickness branch—the mainstay of the society—whilst it was agreed to pay a bonus to the life assurance branch. Considering the fact that the committee, in their printed rules, objects, and special reasons for joining the society, have made special stress on the payment of a bonus, I think it is "unjust," to say the least, to suddenly stop it, and it is especially unfair to those who have been members for over twenty-five or thirty years, and naturally have looked forward to receive their well-earned bonus. According to the opinions of the late secretary, Mr. Addiscott, and Mr. Cresford, the actuary, in their report for 1903, they considered it to be "inequitable" to those members shortly reaching the age limit not to receive some benefit of the existing surplus. In these days of war stress it is doubly hard to act in this unfair manner, especially when the society is in a good financial position. I am glad there were present some members who disagreed with the recommendation of the committee, and who voiced their opinions, but who were outvoted.

Baby Week.

In connexion with Baby Week celebrations the National Association for the Prevention of Infant Mortality is organizing a conference to be held at the Central Hall, Westminster, on July 2nd and 3rd. Dr. J. W. Ballantyne will open a discussion on antenatal and neonatal factors in infant mortality, under the chairmanship of Sir Arthur Newsholme; Lady Barrett will open a discussion on institutional *versus* domiciliary treatment of the lying-in mother, under the chairmanship of Sir Francis Champneys; and a discussion on mothers' pensions will be opened by Dr. Harold Scurfield, M.O.H. Sheffield. Lectures on infant care will be given by Dr. Eric Pritchard, Dr. Maurice Craig, Dr. H. C. Cameron, and Dr. C. W. Saleeby, mainly for elementary school teachers. There will also be a practical demonstration on the teaching of mothercraft to schoolgirls, and a lecture on the hygiene of infancy.

Tuberculin Treatment of Pulmonary Tuberculosis.

Dr. Edward E. Prest (Ayrshire Sanatorium, new Cumnock) writes, in reply to Dr. Adam Moss (p. 497), that though tuberculin treatment has been largely used during the last ten years, he supposes that there is not at the present time any one who regards it as satisfactory. Dr. Prest thinks that the cause of most chronic disease is allowing patients to walk about in the early active stage with a temperature such as 101°. While a chronic case such as Dr. Moss describes is occasionally benefited by tuberculin, the majority of such cases are not. Isolated cases are, Dr. Prest considers, of no value in estimating the results of treatment.

The Cases Attributed to Botulism.

Dr. E. H. M. Milligan, D.P.H. (Bath), writes to suggest that in investigating the cause of the obscure cases of nervous disease which have been described as perhaps due to botulism, attention should be given to the possibility of the presence of the *Diplococcus intracellularis*, the cause of cerebro-spinal fever, for in many cases the cerebro-spinal symptoms are absent and gastro-intestinal or other symptoms predominate.

Penetrating Wound of Heart (Civilian Practice).

Dr. S. D. Clippingdale (London, W.) writes: Mr. Wightman's interesting case of a child who lived five days after receiving a penetrating wound of the heart is not without precedent. Dr. Thomas Davies, in his *Diseases of the Heart and Lungs* (London, 1835), mentions the case of a patient, also a child, who lived thirty-seven days with his heart transfixed by a splinter of wood three inches long. As in Mr. Wightman's case, a *post-mortem* examination was made.

Trivial Wounds of the Fingers.

Dr. J. A. Rooth (Brighton) writes that he has been struck by the fact that trivial pricks and cuts of the fingers frequently suppurate. Remembering the frequency of pyorrhœa and carious teeth he attributes this to the sucking of such wounds and suggests that lecturers on first aid should point out that the habit is dangerous.

A Socratic Dialogue.

A. The matter as regards the Athenian physicians and the new laws of military service seems to me to stand thus: In the first place, we admit or we do not admit that it is the paramount duty of every citizen of whatsoever age and condition to do all that lies in his power to aid the state in its endeavour to overthrow our potent enemy, the Lacedaemonians, who seek to destroy us and our allies and to impose their will upon the world.

S. That is well said. We will agree that this obligation is recognized by every good Athenian.

A. It follows, then, that my brother physicians—who are by no means behind their fellow citizens in patriotism—are ready to do all that is asked of them in furtherance of this good cause.

S. Here, as it seems to me, you fall into some confusion of thought.

A. How so? Do you deny the public spirit of our physicians?

S. It is far from my wish to deny this, and indeed it would be foolish to do so, for the contrary is well known to me and to all sensible Athenians.

A. Where, then, has my reasoning led me astray?

S. I will try to answer that by putting one or two simple questions to you. Is it not the fact that physicians are members of a learned profession?

A. I should be sorry to deny it.

S. And are they not by their training and through the exercise of their art better able than most men to judge their fellow citizens both in health and in sickness?

A. That assuredly is my belief.

S. Then we are agreed, I take it, that the physician wishes to do his utmost for the state in this crisis, and that he is less likely than others to be deceived by those who would point out his duty to him? Is that not so?

A. I see what you are leading up to; but the physician no less than any other citizen must submit himself to the authority of those who are entrusted with the conduct of affairs, otherwise there would be an end to government, and we should be delivered into the hands of the Lacedaemonians.

S. It is clear to me that no sophistry can prevail against your sturdy patriotism. Let us therefore abandon all dispute as to the right of private judgement when the state is in danger.

A. I acknowledge your concession. To proceed: it is beyond question that physicians, whose obligation to serve the state is not a whit less than that of any other man, have had and still have under the new laws special treatment. As heretofore they are to be taken for service with the army or left to minister to the needs of the civil population at the discretion of their peers—a thing conceded to no other section of the community. Furthermore, when they join the armed forces they are allowed to exercise their own calling almost by right, and they receive higher pay than those who have no choice as to how they shall serve their country when called upon to do so. Such privileges being ours, my blood boils when I hear it argued by factious persons that physicians, in virtue of their calling, or by reason of anything else whatsoever, have a claim to be treated yet more tenderly than other citizens.

S. I hope I should be the last to deny the force of much that you have said. Nevertheless, there are certain remarks which occur to me. First, I would ask you whether this differential treatment has been accorded to the physicians by reason of some special feeling of tenderness towards them as a body or as individuals?

A. I cannot read the minds of other men, least of all those of our rulers.

S. Next I think you should explain why it is that the new laws raising the age of military service have added five years to the obligation of the physician as apart from other men.

A. It may be in order to balance the five years at the other end of the scale, during which the student of our art is exempt from the heat of battle.

S. You argue, then, that it is an ingenious measure of justice?

A. Perhaps I should withdraw that. On second thoughts I perceive the reason to be that physicians above all men deal in an indispensable commodity, for which the demand has grown greater through the operations of war.

S. That is a more likely explanation. And may not that be also the answer to my previous question as to the special consideration shown by our rulers towards your calling?

A. It may be.

The Belgian Doctors' and Pharmacists' Relief Fund.

Subscriptions to the Second Appeal.

The following subscriptions and donations to the Fund have been received during the week ending May 11th:

	£	s.	d.
Dr. Alfred Cox	1	1	0
Dr. J. Cryer...	3	3	0
Capt. J. Rutter Williamson	1	1	0
Dr. S. Moore	1	1	0
Dr. E. Eyre Lloyd ...	2	2	0
Dr. J. R. Preston	1	1	0
Brigade-Surgeon Lieut.-Col. Salaman, I.M.S. ...	1	0	0
Dr. J. M. Callender ...	1	1	0
Dr. Marguerite Wilson...	1	1	0
British Medical Assoc. ...	105	0	0
Dr. Mary Carew Hunt ...	2	2	0
Dr. D. N. Seth-Smith ...	1	1	0
Dr. I. B. Muirhead ...	3	3	0
Dr. J. F. Blurton	1	1	0
Dr. Norah Kemp	2	2	0
Dr. H. Creemer Cooper	5	5	0
Dr. Helen Ingleby ...	1	0	0
Dr. F. Claude Evill ...	2	2	0
Dr. Jas. Middlemass ...	1	1	0
Mr. P. A. Ross	1	1	0
Col. Charles E. Harrison	3	3	0
South-Eastern Counties Division, B.M.A. (per Dr. Oliver):			
Dr. J. W. Somerville ...	3	3	0
Dr. S. Davidson... ...	2	2	0
Dr. R. Evans	1	1	0
Dr. N. P. Fairfax ...	0	10	6
Dr. W. Le Cullen ...	0	10	0
Dr. M. J. Oliver ...	1	1	0

Monthly Subscriptions.

	£	s.	d.
Captain Henry L. P. Hulbert, M.D., R.A.M.C.	1	0	0

Subscriptions to the Fund should be sent to the Treasurer, Dr. H. A. Des Vœux, at 14, Buckingham Gate, London, S.W.1, and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Limited.

Appeal for the Family of the late Dr. Kite.

The Rev. P. M. Wathen (Welwyn) and Dr. A. E. Giles (10, Upper Wimpole Street, W.1) write to acknowledge with many thanks the following further contributions to this fund:

	£	s.	d.
Anon. (Macclesfield)	0	10	0
Anon. (Welwyn)	0	9	6
Mr. H. W. Carson, London	5	0	0
Dr. G. Crichton, London (further contribution) ...	0	14	0
Dr. Charles Hall, London	2	2	0
Captain Oakely (on active service)	5	0	0

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Seven lines and under	0	6	0
Each additional line	0	0	9
Whole single column	4	0	0
Whole page	12	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

Note.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.